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United States
Department of
Agriculture

**Chugach
National
Forest**

R10-MB-76

June 1989

Big Islands Management Area

Final Environmental Impact Statement



Big Islands Management Area Final Environmental Impact Statement

U.S.D.A.- Forest Service
Alaska Region
Alaska

Chugach National Forest

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Reply to: 1950

Date: July 21, 1989

Dear Friend of the Chugach National Forest:

We have prepared a Final Environmental Impact Statement (FEIS) for the Big Islands Management Area. This FEIS is a result of a management area analysis conducted by a team of Forest Service resource specialists.

The purpose of the FEIS is to disclose environmental information on a range of alternatives in order to make a decision on a selected alternative. I have documented my decision in the Record of Decision. This decision was not based on any one factor, rather it was based on a course of action that best addresses the major issues raised during the scoping process.

The FEIS discloses the environmental effects of all 7 alternatives considered and discusses the mitigation measures developed to eliminate, avoid, or minimize potential impacts of the selected alternative. Monitoring will evaluate the effectiveness of the mitigation measures, the effects of project activities and how well objectives are being met.

Of the 7 alternatives in the FEIS, Alternative 7 is the selected alternative. Under this alternative the Forest Service will issue a special use permit to Chugach Alaska Corporation for development of a road between MacLeod Harbor and Patton Bay on Montague Island. This road will be used by the Chugach Alaska Corporation for about 20 years and then it will be obliterated and revegetated.

If you have any questions concerning the Final Environmental Impact Statement please feel free to call either Rod Kuhn or Fred Patten of my staff at 907 271-2500.

Sincerely,

Peggy Fox

for DALTON DU LAC
Forest Supervisor

SUMMARY

Introduction

The Chugach National Forest Land and Resource Management Plan of 1984 provided general direction for management of the Forest. By an amendment negotiated in 1986, the Forest Service agreed to prepare a Management Area Analysis (MAA) for each of nine geographic areas within the Forest to provide further detail about the lands and resources on which to base management activities.

Since such management actions as timber cutting, road construction, wildlife habitat manipulation and the development of recreation facilities are considered significant actions under the terms of the National Environmental Policy Act (NEPA), they must be analyzed for their environmental impacts.

The Big Islands Management Area Analysis is the first of these analyses to be completed and subjected to environmental assessment. It will lead the way for the Forest to select a set of actions for managing forest resources. In addition, it will permit the Forest Supervisor to act on a request from an adjacent private land owner for access across National Forest land. This request from the Chugach Alaska Corporation is based upon the terms of the Alaska National Interest Lands Conservation Act (ANILCA).

The Big Islands management area consists of Hawkins, Hinchinbrook, Montague, Green, Little Green and Wooded Islands and The Needle, all located in Prince William Sound in Southcentral Alaska. National Forest lands within the management area include approximately 314,000 of the 370,000 total acres.

Seven alternatives for management are discussed in the following pages. They range from no action to an alternative which deals only with the request for road access to connect the private parcels, to alternatives which provide recreation facilities in anticipation of increased demand.

Because of direction in the amended Forest Plan, the majority of actions proposed in the MAA would be located on Montague Island.

Management Area

The terrain is made up of low rolling hills and glaciated mountains with steep side slopes. Streams often form outwash plains and alluvial fans at the mouths of the narrow valleys. Elevations range from sea level to almost 3,000 feet. The marine climate is marked by cool moderate temperatures, high precipitation and severe storms.

The alluvial fans, outwash plains and steep sideslopes are generally vegetated by Sitka spruce forests where they occur at elevations less than 500 feet. Slopes at higher elevations and gentle slopes in the rolling hills are normally dominated by muskeg and mosses.

Wildlife species include Sitka black-tailed deer, brown bear and bald eagle. Anadromous fish are found in the lower streams on the islands.

Major attractions of this area include protected marine inland waters, sheltered bays and coves, wild beauty, remoteness of the islands and excellent hunting and fishing. There are no roads in the management area.

Purpose and Need

The purpose of this Enviromental Impact Statement (EIS) is to disclose and discuss the various environmental impacts of proposed activities in the management area. The EIS is required before the Forest can implement the amended Forest Plan.

Forest Plan

The Primary Management Goals for the Big Island Management Area are:

Increase developed and dispersed recreation opportunities

Maintain landscape character

Enhance marine-oriented recreation opportunities

Maintain wildlife habitat

Improve fish habitat

As a result of a 1984 appeal of the Chugach National Forest Land and Resource Management Plan, it was amended in 1986. In the amendment, which resolved the appeal, the Forest Service agreed:

to adopt interim management measures to increase assurance that the current character of specific portions of the Forest is maintained (for this management area, Hinchinbrook Island would be managed consistent with a Primitive Recreation Opportunity Spectrum (ROS) class conditions); ROS is a classification system in which lands are identified for their ability to provide recreation experiences.

to undertake a series of NEPA based analyses on the nine management areas during the next seven years to supplement existing data and to amend the Forest Plan and

to lower the timber offering from 16.9 million board feet (mmbf) annually to a level not to exceed an average of 6.3 mmbf for the first five years and 10.6 mmbf for the second five years; (the Big Islands Management Area would contribute 36 mmbf to the timber offering for the planning period.)

In addition the Forest has:

1. improved inventories for minerals, recreation and timber;
2. gathered information on subsistence activities;
3. assessed transportation needs;
4. assessed effects of land selections;

5. assessed the environmental effects of certain proposed management actions;

6. developed standards and guidelines specific to this management area which supplement Forest Plan direction; and

7. developed prescriptions which are specific direction to an individual project or area.

Planning Process

The planning process includes identification of issues, collection and interpretation of the data, development of alternatives, estimation of environmental consequences, evaluation of alternatives and identification of a selected alternative.

Issues, Concerns, and Opportunities

Public comment on future management of the Big Islands Management Area was solicited through newspaper advertisements, public meetings and contact with concerned organizations, agencies, groups and individuals. The analysis of hundreds of opinions and comments resulted in the identification of nine central issues and planning questions.

The nine issues and questions are:

1. Special Uses

What uses should be allowed under permit on National Forest lands and where should they occur?

2. Minerals Management

How should the minerals resource be managed?

3. Access

How should access to, and on, the National Forest lands be managed?

4. Fish Habitat

How should fish habitat be managed?

5. Wildlife Habitat

How should wildlife habitat be managed?

6. Coordinated Management

How should the Forest Service coordinate management of the National Forest and private lands?

7. Timber Management

How should the timber resource be managed?

8. Recreation Management

How should the recreation resource be managed?

9 Landscape Management

How should the landscape (the visual resource) be managed?

Alternatives

The process of alternative development began with the scoping of issues, field reconnaissance and data collection by an interdisciplinary team and the study of existing resource inventories.

Alternative 1

The No Action Alternative prescribes that only minimal management activities would occur. These include operation and maintenance of existing Forest Service facilities, administration of existing permits, inventories and feasibility studies.

Alternative 2

Alternative 2 concentrates resource development on the south end of Montague Island between MacLeod Harbor and San Juan Bay. Present recreation opportunities would be maintained by keeping new recreation development to a minimum and concentrating additional investments on the rehabilitation of existing facilities. Approximately 20.9 mmbf of timber would be offered for harvest, requiring 38.6 miles of roads. Mature forest wildlife habitat on the remainder of Montague Island and the San Juan Bay and Nellie Martin River high value stream habitat zones would be protected. Fish habitat feasibility studies, if implemented, could result in the harvest of 201,400 pounds of fish per year.

Figure S-1 lists the proposed projects and outputs by alternative.

Alternative 3

Alternative 3 also concentrates resource development between MacLeod Harbor and San Juan Bay on the south end of Montague Island. New recreation facilities and improved road access would be constructed. Approximately 30.9 mmbf of timber would be offered for harvest, requiring 45.8 miles of roads. Mature forest wildlife habitat on the remainder of Montague Island would be maintained. Wildlife and fish habitat capability would be maintained in high value stream habitat zones in the Nellie Martin River area. Harvest in the high value stream habitat zones in San Juan Bay would be limited to areas without substantial braided channel habitat. Fish habitat feasibility studies, if implemented, could result in the harvest of 201,400 pounds of fish per year.

Alternative 4

Alternative 4 disperses forest management activities around the south end of Montague Island from MacLeod Harbor to Patton Bay. The developed recreation sites would be increased by the addition of new recreation facilities and by taking advantage of the road to provide access. Approximately 28.6 mmbf of timber would be offered for harvest, requiring 57.6 miles of road. Timber harvest would be restricted in the Nellie Martin River area to reduce the potential impact on wildlife habitat from

timber harvest on private land in Patton Bay. Wildlife and fish habitat would be maintained in the San Juan Bay and Nellie Martin River high value stream habitat zones. Fish habitat feasibility studies, if implemented, could result in the harvest of 221,700 pounds of fish per year.

Alternative 5

Alternative 5 proposes high levels of management activities for all resources on the south end of Montague Island, with a significant emphasis on the recreation resource. It recognizes the potential of Prince William Sound for recreation and tourism. Developments would be directed to either the Forest Service-permitted lodge at MacLeod Harbor or partnerships with private interests to provide tourist facilities. The Forest Service would develop natural and cultural resource interpretative sites.

Approximately 35.9 mmbf of timber would be offered for harvest, requiring 62.3 miles of road. Timber harvest would be limited in mature forest wildlife habitat in the Nellie Martin River area. Timber harvest would be limited to areas without substantial braided channel habitat in the high value stream habitat zones in the San Juan Bay and Nellie Martin River areas. Fish habitat feasibility studies, if implemented, could result in the harvest of 221,700 pounds of fish per year.

Alternative 6

Alternative 6 proposes development of the south end of Montague Island with high levels of forest management activities for all resources. Forest management activities would be dispersed around the south end of Montague Island from MacLeod Harbor to Patton Bay. Approximately 36.5 mmbf of timber would be offered for harvest, requiring 64.3 miles of road. Timber harvest in the San Juan Bay and Nellie Martin River high value stream habitat zones would be limited to areas without substantial braided channel habitat. The amount of developed recreation would increase through the addition of new facilities and by taking advantage of the road to provide access to the south end of Montague Island. Fish habitat feasibility studies, if implemented, could result in the harvest of 221,700 pounds of fish per year.

Alternative 7

Alternative 7 addresses a request from the Chugach Alaska Corporation for access to its lands on Montague Island. A special use permit would be granted for a temporary road from MacLeod Harbor to Patton Bay which would be closed to public use and obliterated prior to the close of the permit. Only minimal management activities would occur on National Forest System land. This includes operation and maintenance of existing Forest Service facilities, and the administration of the special use road and other existing permits, inventories and feasibility studies.

Figure S-1

Big Islands Management Area
Activities, Outputs and Effects

		Alternatives						
OUTPUTS/ACTIVITIES	Units	1	2	3	4	5	6	7
Total Road	Miles	0	38.6	46.0	57.6	62.3	64.3	34.5
Total Road Cost	Million Dollars	0.00	4.65	5.60	6.99	7.56	7.86	0
Nonmotorized Trail	Miles	0	.25	6.0	14.0	26.25	11.75	
Motorized Trail	Miles	0	0	0	0	7	0	0
Trail Head Parking	Number	0	0	3	6	7	7	0
Salt Water Access	Number	0	0	3	3	3	3	0
Anchor Buoys	Number	0	1	1	1	1	1	0
LTF National Forest	Number	0	1	1	0	0	0	0
LTF Private Lands	Number	2	2	2	1	1	1	1
Air Strip Studies	Number	0	0	2	2	5	2	0
Fisheries Studies	Number	4	8	8	14	14	14	0
Fish Produced per year	Pounds	0	201400	201400	221700	221700	221700	0
Timber Volume	MMBF	0	20.9	30.9	28.6	36.0	36.5	0
Total Area Harvested	Acres	0	777	1,014	999	1,151	1,219	0
Timber Sale Net Value	Thousand	0	-1,242	-570	527	1,239	971	0
Rec. Use Increase	RVD	0	1,934	3,646	6,266	28,630	6,108	0
Tent Platform/Shelter	Number	0	0	1	3	3	3	0
New Cabins	Number	0	2	2	2	8	2	0
EFFECTS								
Visual Quality Obj. not met-Montague Is.	Acres	1237	1549	1647	1531	1541	1545	1273
Present Value All Resources	Thousand Dollars	1418	-325	-238	-3	190	295	1595

Comparison of Alternatives

This section presents comparisons of the alternatives by issue. Refer to Figure S-1 in the previous section for comparison of projects and outputs by alternatives.

Issue #1 - Special Uses

The Management Area-wide Standards and Guidelines in Appendix F provide additional direction for the management of activities that require special use permits. These standards and guidelines do not vary between alternatives. Outfitter/guide capacity, as measured in terms of campsites, was evaluated and is the same for all alternatives. The greater access and a larger number of facilities proposed in Alternative 5 could result in more recreation special use permits.

Issue #2 - Minerals Management

The National Forest would respond to requests for exploration and development of minerals in the same manner in each alternative. Guidance would be provided in the standards and guidelines. Improved access to south Montague Is. provided in Alternatives 2 through 6 may create an interest in minerals exploration and development. However, current information shows a low potential for mineral development on the island.

Issue #3 - Access

All alternatives, except Alternatives 1 and 7, increase access for recreation, timber, wildlife and fisheries management. The proposed arterial road could be constructed independent of Forest Service management activities and could provide indirect opportunities for National Forest management activities such as a feasibility study for fish habitat improvements.

Alternatives 2 and 3 would require one log transfer facility be built on National Forest System land and possibly two additional facilities on private land. Alternatives 4, 5 and 6 also provide for coordinated access management with adjacent private landowners. Development of the road system in Alternatives 4 through 7 would require only one log transfer facility which would be built on private land at MacLeod Harbor. This would reduce the effects on the marine environment since fewer log transfer facilities would be required.

Issue #4 - Fish Habitat

Fish habitat on Hinchinbrook, Hawkins and Green Islands would not be affected by proposed management activities under any of the alternatives.

Timber harvest and road-building activities would occur within the watershed of six fish streams on Montague Island in Alternatives 2 and 3 and 13 in Alternatives 4, 5 and 6. The proposed special use road in Alternative 7 would occur within the watershed of 13 fish streams.

Proposed management activities would not significantly impact populations of aquatic Management Indicator Species or the aquatic habitat capability of streams within the Big Islands Management Area under any of the action alternatives.

Opportunities for fish habitat enhancement would be studied in Alternatives 1 through 6 with the greatest potential being in Alternatives 4, 5 and 6.

Issue #5 - Wildlife Habitat

The proposed management activities under all of the alternatives would not significantly impact the habitat capability of any of the Management Indicator Species within the Big Islands Management Area.

Wildlife habitat on Hinchinbrook, Hawkins and Green Islands would remain unchanged under all alternatives.

The habitat capability on Montague Island that supports deer under severe winter conditions would be unchanged from timber harvest under Alternatives 1 and 7 and reduced two to four percent under Alternatives 2 through 6.

Habitat capability for brown bears would be affected by the removal of two to seven percent of the riparian/beach fringe habitat on Montague Island under Alternatives 2 through 6. The potential for adverse impacts to brown bears from improved road and trail access and increased human activity is greatest under Alternative 5, followed by Alternatives 6, 4, 3, 2, 7 and 1.

Alternative 5 has the greatest potential for disturbance to nesting eagles from increased human activity, followed by Alternatives 6, 4, 7, 3, 2 and 1 respectively. Only one eagle nest is within or adjacent to a proposed harvest unit (Alternatives 2 and 3). All nests will be protected by establishing and maintaining a 330-foot windfirm buffer around each nest.

Issue #6 - Coordinated Management

Alternative 1 does not address to the issue of coordinated management.

Alternatives 2 and 3 propose access that serves only National Forest System resources. National Forest management activities would be conducted away from private lands reducing cumulative effects over what would occur in Alternative 4, 5 and 6. Alternatives 4, 5 and 6 provide for a jointly developed access system, while Alternative 7 provides for the access needs of only the private landowner.

Alternative 5 identifies opportunities to coordinate recreation facilities and services between the Forest and private landowners.

Issue #7 - Timber Management

Timber management would not occur under Alternatives 1 or 7. Alternatives 2 through 6 concentrate all timber harvest on the southern portion of Montague Island. Acres to be logged range from 777 to 1,219, resulting in a volume offered for sale that ranges from 20.9 to 36.5 mmbf.

With a cost-share agreement between the forest service and the private landowner for the construction of the arterial road, Alternatives 4, 5 and 6 result in a positive appraised net value, with Alternative 5 providing the greatest appraised value.

Issue # 8 - Recreation Management

For all action alternatives, primitive conditions are maintained over the entire management area with the exception of the south end of Montague Island. As a result of road access provided under Alternatives 2 through 6, there is a slight shift from primitive to motorized recreation opportunities.

Hunting and fishing opportunities increase the most in Alternatives 4, 5 and 6.

Recreation facilities and services increase in Alternatives 3 through 6 with Alternative 5 providing the most significant increase.

Issue #9 - Landscape Management

The major impact on the visual resource is a decrease in the natural character of the landscape due primarily to timber harvest and road construction. For all alternatives, that decrease is relatively small in the context of the entire management area, since those activities would be concentrated on the south end of Montague Island.

Other Environmental Effects

Roadless Character

Alternative 1 would not alter the roadless character on Montague Island. Alternatives 2 and 3 would result in approximately 23,600 acres of national forest land being changed to a roaded character, while Alternatives 4, 5, 6 and 7 would result in approximately 54,500 acres being changed to a roaded character.

In all alternatives, the roadless character of Hawkins, Hinchinbrook and Green Islands would remain unchanged.

Soil and Water

Development activities in Alternatives 2 through 7 could increase mass movement and surface soil erosion resulting in stream sedimentation. Standards and Guidelines will be applied to reduce the potential for this to occur.

Subsistence

The impacts of all action alternatives, including reasonably forseeable future and planned activities, would not significantly impact subsistence use.

Social and Economic

Road development and timber harvest activities would increase the opportunities for roaded recreation. These activities would alter fish and wildlife habitat and visual

quality. Timber harvest on public and private lands in the project area will impact dispersed recreation use and roadless attributes.

Alternatives 1, 5, 6 and 7 generate a positive present net value while Alternatives 2 through 4 are negative.

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Chapter 1
Purpose and Need

Chapter 1
Purpose and Need

Introduction

The purpose of this Final Environmental Impact Statement (FEIS) is to disclose the effects of alternative actions for the Big Islands Management Area under the direction of the Chugach National Forest Land and Resource Management Plan as amended. This document is presented to the public for review and comment. Unless specifically noted, the existing management direction in the amended forest plan is applicable.

The need for the management area analysis (MAA) and an environmental impact statement (EIS) for the Big Islands Management Area arises from: actions proposed in the amended Chugach National Forest Land and Resource Management Plan (forest plan); and a request for access by the Chugach Alaska Corporation (CAC) to its lands on Montague Island. As allowed by the provisions of the National Environmental Policy Act (NEPA), this document builds on the existing amended forest plan.

Management area analysis starts with the goals of the forest plan and gives additional guidance to the forest service. Management area analysis will guide the forest supervisor throughout the land management decision making process.

An interdisciplinary team developed the array of alternative in response to the issues, concerns, opportunities and the goals and primary management practices outlined in the amended forest plan. Seven alternatives were developed with the assistance of interested individuals and organizations. Each alternative would: affect the environment differently; provide different recreation, wildlife, fish and timber opportunities; require different expenditures; and pose different implications for local economies.Planning process records are available at the Supervisor's Office of the Chugach National Forest, 201 East Ninth Avenue, Anchorage, Alaska 99501.

Forest Plan Direction

The Chugach National Forest Land and Resource Management Plan as amended in 1986 established the management direction for the Big Islands Management Area. The primary management goals and primary management practices identify the overall objectives for the area. More specific direction for project implementation is provided in the Forest-wide and Big Island Management Area Standards and Guidelines.

The primary management goals for the Big Island Management Area are:

Increase developed and dispersed recreation opportunities

Maintain landscape character

Enhance marine-oriented recreation opportunities

Maintain wildlife habitat

Improve fish habitat

The primary management practices for the Big Islands Management Area are:

Develop a marine recreation system

Construct and maintain cabins and marine recreation facilities

Harvest timber and reforest

Improve commercial fish habitat

The amended forest plan estimated the average annual outputs for the Big Island Management Area between 1986 and 1990. They are:

5 ,000	recreation visitor days of developed recreation
25,000	recreation visitor days of dispersed recreation
0	acres of wilderness
0	recreation visitor days in wilderness
2 ,000	wildlife-related recreation visitor days
0	acres of wildlife habitat improvement
1,000	sportfish related recreation visitor days
6	million pounds of commercial fish
36	million board feet of timber harvested
0	mining plans of operations in effect
370,000	acres available for mineral prospecting and development

As a result of a 1984 appeal of the Chugach National Forest Land and Resource Management Plan, the plan was amended in 1986. Four broad actions were agreed upon by the Forest Service and the appellants:

1. The Forest Service agreed to adopt interim management measures to increase assurance that the current character of specific portions of the Forest is maintained. (For this management area, Hinchinbrook Island would be managed consistent with directions for the Primitive Recreation Opportunity Spectrum (ROS) class until the forest plan is revised.) (See Appendix A.)

2. The Forest Service would undertake a series of NEPA-based analyses on the nine management areas during the next seven years to supplement existing data and to amend the forest plan.

3. The Forest Service agreed to lower the timber offered for sale from 16.9 mmbf annually to a level not to exceed 6.3 mmbf annually for the first five years and 10.6 mmbf annually for the second five years. The Big Island Management Area would contribute 36 mmbf to the timber offered for the planning period.

4. The appellants agreed to participate in the accomplishment of these steps and not to initiate or pursue any further direct appeal or judicial review of the forest plan. The agreement did not affect any prior existing rights of the appellants.

Chugach Alaska Corporation Request

The Forest Service received an application for a special use permit from Chugach Alaska Corporation (CAC) for a road across National Forest land on Montague Island. The road would be used to transport timber harvested from CAC land in Patton Bay to a log transfer facility at MacLeod Harbor. It was agreed that the request would be evaluated as part of management area analysis.

Decision to be Made

The decision to be made by this management area analysis is to determine what mix of activities best implements the management direction provided in the forest plan. The decision will select an alternative that contains projects the Forest Service would implement, consistent with the budgetary process, during the life of the forest plan (1986-1996).

Overview of the Management Area

The Big Islands Management Area is located in Prince William Sound. This 370,000 acre management area, which was established by the forest plan, includes Hawkins, Hinchinbrook, Montague, Green, Little Green, and Wooded islands and The Needle. (See Map 1.) Lands within the management area are administered by the Chugach National Forest, the State of Alaska, Chugach Alaska Corporation (CAC), Eyak Corporation and the U. S. Department of Transportation. The 314,041 acres of National Forest System land within the management area are administered by the Cordova Ranger District of the Chugach National Forest in Cordova, Alaska.

Public Participation

The Chugach National Forest, as part of its commitment to "Caring for the Land and Serving People," has sought and received public comment on its planning for forest management. Information, comments and assistance have been sought from federal, state and local agencies and other individuals and organizations interested in or affected by actions considered by the forest. This information has been used in the preparation of this environmental impact statement.

The Chugach National Forest began its public involvement for the Gravina-Big Islands Management Areas with public open houses in May 1986. The focus of those meetings was on the Gravina Management Area Analysis, but the public also commented on issues pertinent to the Big Islands Management Area Analysis. This led to a decision to do a combined Gravina-Big Islands Management Area Analysis. The management area analysis for Gravina and Big Islands Management Areas was interrupted in 1987 by the need to address the spruce bark beetle infestation on the Kenai Peninsula portion of the forest. Upon completion of that examination, forest personnel

returned their attention to the Gravina-Big Islands MAA. Forest Supervisor, Dalton Du Lac, in a June 1987 letter, invited further comment from the public. Responses to that letter, together with the previous comments, were analyzed to build the list of issues, concerns and opportunities that have guided the development of MAA alternatives. A Notice of Intent, published in the Federal Register in October 1987, described the Forest Service's plan to prepare an EIS for Gravina and Big Island Management Areas. A newsletter was distributed in February 1988 toinform the public about the process, schedule and issues of management area analysis.

In its October 1988 Notice of Intent, The Forest Service separated the Big Islands Management Area Draft Environmental Impact Statement (DEIS) from the Gravina Management Area DEIS. The two areas were separated after scoping showed they were distinct in terms of management activities proposed and issues identified by the public. They are two distinct geographic areas that lend themselves to separate analysis.

In addition to the public meetings and comments received in response to the scoping letter and newsletter, Chugach National Forest personnel have met individually with potentially affected groups and individuals. These contacts have informed the groups and individuals as well as has provided further information to the Forest Service.

The scoping process has included:

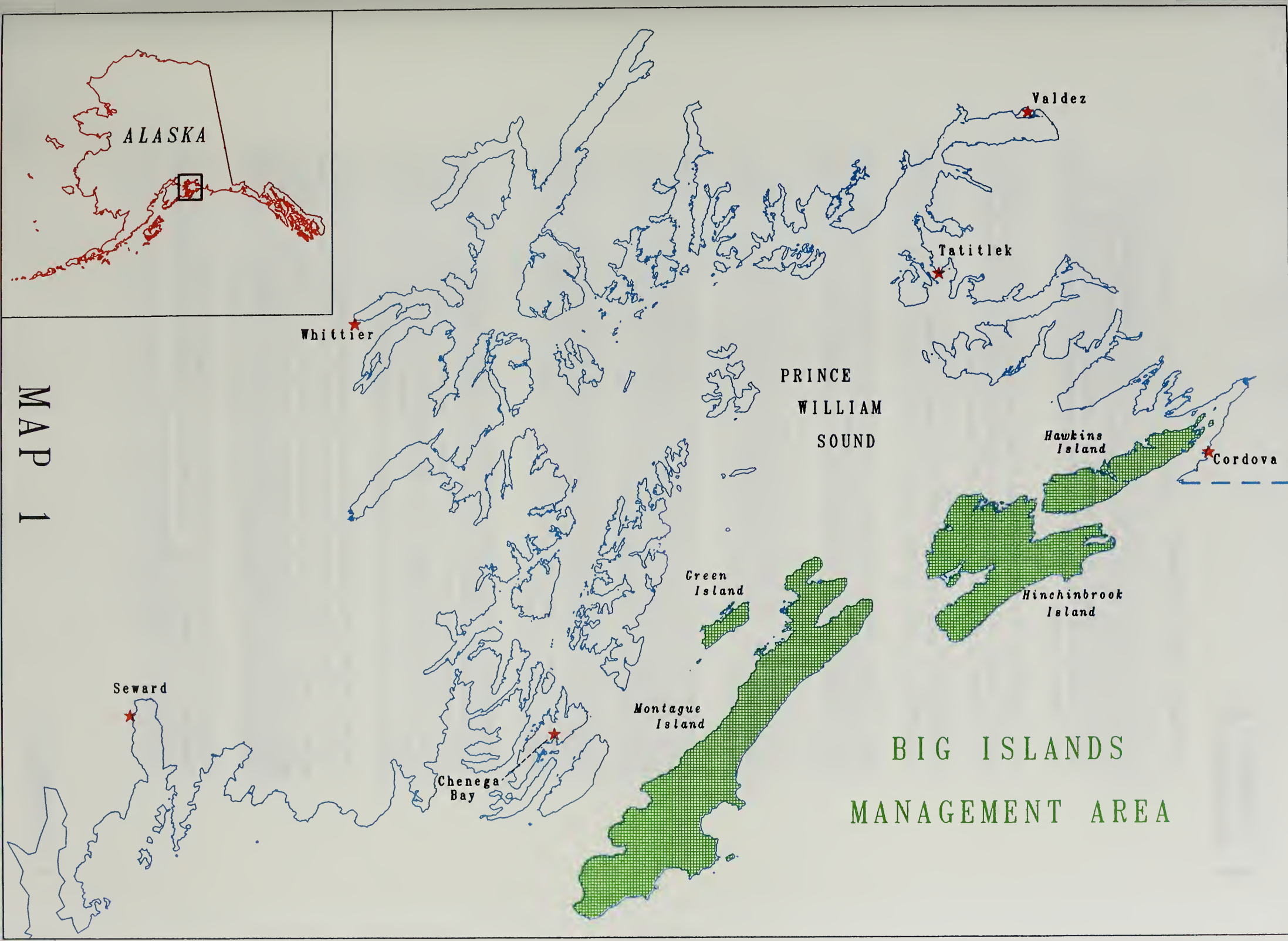
1. Identification of potential issues, concerns and opportunities (ICO).

2. Identification of ICOs to be analyzed in depth.

3. Exploration of alternatives.

4. Identification of potential environmental effects of the proposed action and alternatives.

5. Determination of other government agencies to be consulted, and what form of consultation and cooperation would be appropriate.


ALASKA
MAP 1
Valdez
Tatitlek
Whittier
PRINCE
WILLIAM
SOUND
Hawkins
Island
Cordova
Green
Island
Hinchinbrook
Island
Seward
Montague
Island
Chenega
Bay
BIG ISLANDS
MANAGEMENT AREA

Summary of Public Comments

Comments represented the full spectrum of public opinion, ranging from those favorable to extensive development to those favoring preservation. Comments centered on the effects of forest management activities on the management areas. Other comments indicated concern for development that would contribute to a healthy, diverse local economy.

Public comments regarding private use of the forest by outfitter/guide operations were generally supportive. Comments also supported the Forest Service taking an active role in the management of a variety of other special uses.

In General, most comments about minerals development were positive, but included expectations for environmental protection through prudent resource management.

Public comments on access concerned access across National Forest System and private lands for recreation, timber and other uses; roads around south Montague Island for timber transport; and limiting access to the minimum necessary to meet objectives.

A broad range of concerns were voiced regarding natural fish production, habitat protection, impacts of timber harvest and other development, fisheries enhancement and aquaculture, wildlife transplants and population control.

A broad range of respondents expressed concern about national forest management relative to planned activities on private lands. Concern was expressed regarding cumulative effects on wildlife habitat resulting from timber harvest and other developments from both private and public sectors.

Some comments assumed that private lands would be developed or harvested and that the national forests should be retained as preserves. Other respondents have expressed a desire to defer timber harvest on national forest lands during the same period as private harvests.

Comments were received about the economic aspects of possible timber harvest. There was concern regarding the impact on current timber markets and about national forest competition with privately owned timber. General concern was voiced about below-cost timber sales. Concern was expressed that the Forest Service's planning process is driven by timber production. Other comments expressed a desire to have national forest timber as part of the supply to meet the needs of local industry.

Comments were divided between those favoring recreation development and others preferring a more natural character for the management area. The many users have expressed widely differing needs and desires for how they feel the forest plan goals will be carried out. The public has commented on the increase in litter along beaches and around recreation areas and expressed a desire that such impacts be considered in the development of the management area analysis.

The public expressed concern about potential visual impacts from timber harvests, mining and other developments. Comments were received about the impacts on the visual resource important for marine recreation use.

Issues, Concerns and Opportunities

Public comments and management concerns were used to develop the following issue statements. These public comments and management concerns include opportunities for a variety of resource management activities. The scoping process identified nine issues to be addressed. These issues were used to formulate alternatives and to analyze the environmental consequences of the actions.

1. Special Uses

Issue Statement

What uses should be allowed on national forest lands and where should they occur?

Current Situation

There are many activities and developments that may be conducted under permit on National Forest System lands. They include: outfitter/guides, lodges, tent platforms, subsistence camps, and electronics sites. Within the management area there are outfitter/ guides, a lodge, residences, electronic sites, and navigation aids under permit. In addition, other facilities and services have been suggested during the scoping process to include summer home sites, lodges, refueling stations, and upland support facilities for a variety of marine activities to meet the demands of growing tourism and recreation in Prince William Sound.

Forest plan direction provides guidance for certain special uses but does not address others. Most direction is contained in the Forest-wide Standards and Guidelines under recreation, lands (special use management - non-recreation) and facilities. Forest Service policy states that development of National Forest System lands will complement rather than compete with uses of adjacent private lands. National policy encourages the Forest Service to develop new partnerships to increase recreation opportunities and to contribute to the diversity of local economies.

Analysis Questions

What kind of, and how many special uses should be allowed in the Big Islands Management Area?

Where should these uses be allowed in the Big Islands Management Area?

What effects do these uses have on Big Islands Management Area resources, including subsistence?

Goal

Provide further direction for determining what types and levels of services and facilities should be allowed under special use permit on national forest administered lands in the Big Islands Management Area.

Key Indicator

Does the alternative provide direction to manage special uses? A process will be provided for screening and evaluating special use applications.

2. Minerals Management

Issue Statement

How should the minerals resource be managed?

Current Situation

The forest plan calls for "orderly development of the minerals resource" with the comment that "National need for minerals will require the forest to supply more in the future than it does at present." Forest-wide Standards and Guidelines direct this program.

The entire Big Islands Management Area is currently open for mineral entry and development. The amended forest plan requires the forest to provide additional information on minerals and to consider, to the extent practical, measures to mitigate environmental impacts from mining, including the potential need to withdraw areas from mineral entry.

Analysis Questions

What is the potential for mineral development in the Big Islands Management Area?

Where are the mineral resources located in the management area? Where are mining activities currently being carried out, and where might future mineral activities be located?

How will mineral development impacts be mitigated, including consideration for mineral withdrawal recommendations?

Goal

To the extent practicable, identify in reasonable detail:

1. Current and projected future location and level of development of active mining claims patented or unpatented.

2. Location of probable occurrences of substantial deposits of locatable, leasable and common variety minerals.

3. Current and projected future access needs for exploration and development of active mining claims and areas of probable mineral occurrence.

4. Potential environmental effects of current and projected future exploration and development.

Provide information on exploration, development and management of the mineral resource in the Big Islands Management Area and consider the need for withdrawals.

Key Indicator

Does the analysis provide the minerals information as required by the amended forest plan?

3. Access

Issue Statement

How should access to, and on, national forest lands be managed?

Current Situation

Access to the management area is by water and air. Access needs exist for development and management of forest and private land resources. Forest-wide Standards and Guidelines call for completion of "a forest-wide transportation analysis for the implementation of the Plan, considering access proposed by other entities, which includes various types of travel routes and associated easements." Guidelines also call for the Forest to request, process and complete other actions necessary to cross state and private lands including actions under the Alaska Native Claims Settlement Act (ANCSA) 17(b) and the 1982 Settlement Agreement with Chugach Natives, Inc. (now Chugach Alaska Corporation) to connect their holdings in MacLeod Harbor and Patton Bay.

Analysis Questions

What resources in the Big Islands Management Area are currently accessible and where should new access be provided?

What types of new access will be provided? Is there an opportunity to coordinate access with the private landowners on Montague Island?

How and where will access rights-of-way be identified for Forest users?

What are current and future access needs for exploration and development of active mining claims and areas of probable mineral occurrence?

If roads are constructed, how will use be managed?

Goal

Provide for access to and on national forest lands in the Big Islands Management Area that best meets the needs of forest users.

Key Indicator

Does each alternative provide access for management of all resources and forest visitors and users? Does each alternative meet transportation needs of adjacent landowners? How cost effective is each alternative transportation plan?

4. Fish Habitat Management

Issue Statement

How should fish habitat be managed?

Current Situation

The amended forest plan authorizes fish habitat improvement projects resulting in pounds of fish to provide for sportfishing and commercial needs. Forest-wide Standards and Guidelines describe the four categories of enhancement projects that will be carried out and provide for cooperation with the Alaska Department of Fish and Game (ADF&G) and aquaculture associations in development of these projects.

Analysis Questions

What opportunities exist for improvement of fish habitat?

Where can feasible fisheries projects be located in the Big Islands Management Area?

How many fish projects will be carried out?

How will fish habitat be protected?

What opportunities exist to increase sportfishing as measured in wildlife fish user days (WFUD)?

Goal

Maintain and improve fish habitat, minimize effects on existing fish habitat and provide additional suitable habitat to enhance commercial and sportfishing opportunities.

Key Indicator

To what extent do the projects planned in each alternative maintain or improve fish habitat (as measured by pounds of fish), WFUDs and affect Management Indicator Species habitat?

5. Wildlife Habitat Management

Issue Statement

How should wildlife habitat be managed?

Current Situation

The Big Islands Management Area supports many wildlife species. While the forest plan does not call for wildlife habitat enhancement, it does contain a primary management goal to "maintain wildlife habitat."

Analysis Questions

How will habitat be managed and capability maintained in the Big Islands Management Area?

What feasible opportunities exist for wildlife habitat improvement?

What opportunities, appropriate to the recreation setting, exist to increase wildlife user days?

Goal

Maintain habitat capability of Management Indicator Species and increase use of wildlife resources.

Key Indicators

How is habitat capability affected for Management Indicator Species?

To what extent does each alternative increase wildlife user days?

6. Coordinated Management of National Forest System and Other Lands

Issue Statement

How should the Forest Service coordinate management of the national forest in relation to state and private lands?

Current Situation

The management area contains a mixture of land ownerships and associated management activities. A primary management practice under the forest plan directs that the forest "Coordinate management practices with adjacent landowners." Forest-wide Standards and Guidelines direct that the forest "seek ways to complement development of lands of other ownership" in development of the recreation resource.

In addition, the forest is to "Direct private or commercial recreation development to private lands ...." and to "Encourage development on private land to meet the demand for summer homes, resorts, other accommodations and commercial public services."

The MAA must analyze the effects of Forest Service management in combination with that of the other landowners in the area. This means that the Chugach National Forest will examine the plans that exist for the development of those non-National Forest lands, estimate the intensity of that development and determine the cumulative effects of those activities and the activities on National Forest System lands.

Analysis Questions

What opportunities for coordination exist and how will they be pursued?

How would the Forest Service coordinate management of the Big Islands Management Area with the management of adjacent lands in other ownerships?

Goal

Coordinate management of national forest lands with state and private land owners in the Big Islands Management Area, recognizing both public and private needs and disclosing cumulative effects.

Key Indicator

The alternatives will be judged on how well they provide for coordination with management of state and private lands.

7. Timber Management

Issue Statement

How should the timber resource be managed?

Current Situation

A primary management practice for the management area is to "Harvest timber and reforest." The amended forest plan estimated a 3.6 mmbf harvest per year. The plan also permits other silvicultural practices and provides standards and guidelines for those practices.

Analysis Questions

Where, when and how would timber sale offerings occur in the management area?

How can the Forest Service best make timber sales in the management area cost efficient?

How can the Forest Service manage timber resources consistent with other resources?

Goal

Offer timber for sale to local industry, while coordinating that offer in such a way that other resource opportunities may be addressed and/or enhanced. Address cost efficiency of timber harvesting in the management area.

Key Indicator

What will be the timing and location of timber sale offerings in relation to sales by other landowners?

What will be the cost efficiency as measured by present net value, timber sale volume offered and benefit to cost?

8. Recreation Management

Issue Statement

How should the recreation resource be managed?

Current Situation

The forest plan estimates recreation uses for the management area in terms of visitor days. Primary management goals for the management area call for the forest to:

1. "Improve (also enhance) marine-oriented recreation opportunities"

2. "Maintain dispersed recreation opportunities"

3. "Increase developed and dispersed recreation opportunities".

Primary management practices call for the forest to develop a marine recreation system (specific locations are named in the plan and identified "for evaluation for feasibility"). Primary management practices also call for the forest to construct and maintain cabins and marine recreation facilities (numbers of cabins, anchor buoys and tent platforms are laid out in the plan; however, locations are not included).

The forest plan proposes a number of recreation projects to bring this about. The Forest Plan Standards and Guidelines call for the implementation of the Recreation Opportunity Spectrum (ROS) to be used as a guide for displaying on-the-ground recreation objectives. The classifications under this system need to be integrated with other resource activities.

Analysis Questions

How will the recreation goals for the Big Islands Management Area be carried out? Where will recreation opportunities be provided?

What will be the role of the Big Islands Management Area in providing recreation opportunities relative to those that may be provided by adjacent landowners?

How can the forest integrate the ROS classification system with the other proposed management activities?

Goal

Provide a recreation setting that will meet the needs of current and future national forest visitors. Provide opportunities for state and local governments, private organizations (both profit and non-profit) and interested individuals to work in partnership to expand and enhance recreation opportunities in the Big Islands Management Area.

Key Indicators

What location, type and amount of new recreation facilities, programs and services will be provided by the Forest Service and other parties, as reflected by projected increases in Recreation Visitor Days (RVD's).

How many acres would be managed for each ROS class?

9. Landscape Management

Issue Statement

How should the landscape (the visual resource) be managed?

Current Situation

Provisions for management of the visual resource are contained in the Forest Plan. Direction in the plan is to "Maintain Landscape character." Forest-wide Standards and Guidelines also state that the Visual Quality Objectives (VQOs) are adopted for use on the Forest. Based on this direction, the MAA would address integration of landscape management with other resource management activities for the management area.

Analysis Questions

What is the best way to implement prescribed management activities while maintaining landscape character?

How can the forest integrate the adopted VQOs and the goals for other management activities in the Big Islands Management Area?

Goal

Integrate landscape management objectives into multiple use management activities.

Key Indicators

Evaluate visual quality based on:

The number and location of acres in each visual condition class resulting from implementation of each alternative.

The number and location of acres that would be managed under each VQO under each alternative.

Issues Not Addressed in the Planning Process:

Cultural resources management

Cultural resources were mentioned as a "non-renewable resource" which required proper planning so that irreversible damage would not occur.

Federal law sets out requirements for protecting cultural resources. These requirements are reflected by direction for cultural resources management in the Forest-wide Standards and Guidelines.

Planning process:

Public comments have urged that the planning process and project proposals meet legitimate resource needs, meet public needs and be economically sound.

The public comments about the planning process were not tracked as an issue but are answered through this MAA.

Wilderness:

Some people would like to see Wilderness designation in Big Islands Management Area.

Wilderness allocation is a forest plan decision. The forest plan recommended College Fiord and Nellie Juan (1,703,000 acres) to be designated as wilderness.

The forest plan allocated the Big Island

Management Area to multiple use management.

Therefore, wilderness recommendation is beyond the scope of the decision making process for this management area.

Below cost timber sale:

Some individuals are concerned that the cost of preparing, offering and administering timber sale contracts are less than the revenues received by the federal treasury.

Below cost sales only compare dollars spent with dollars received and make no allowances for the many other benefits that sales accrue to the public. The forest's analysis incorporates information on total costs and revenues of the timber program as well as effects on local economies during the planning period. The analysis also incorporates benefits and costs for all resources as a result of implementing the proposed alternatives.

Chapter 2
Alternatives Including the Proposed Action

Chapter 2
Alternatives, Including The Proposed Action

Introduction

The purpose of this chapter is to display seven alternatives for managing land and resources in the management area. This chapter provides: 1) a description of the process used to formulate the alternatives; 2) a description of each alternative, including the proposed action; 3) a comparison of the alternatives and their effects; 4) the identification of the proposed action; and, 5) a description of actions common to all alternatives, including mitigation measures that will be taken to reduce adverse environmental effects. This chapter also discusses the reasons for eliminating other alternatives from detailed study.

The array of alternatives was designed to explore a variety of ways to respond to issues, concerns and opportunities identified by the public and the Forest Service. Each alternative is a mix of site-specific proposals differing from other alternatives by the identification and location of activities. Each alternative would produce different environmental conditions. This range of alternatives provides a basis for judging which alternative provides the most public benefit.

Process Used to Formulate the Alternatives

The formulation of the alternatives is in response to specific issues and opportunities identified through public and Forest Service participation in the scoping process, responses to the DEIS for the management area and management direction in the amended forest plan.

The specific steps undertaken were:

1. Resource data was updated and recorded in the Geographic Information System (GIS).

2. Maps were prepared for each resource, taking into account the latest available information.

3. Comparisons were made for compatibility and potential conflict among the resource uses to identify areas for forest management activities This step involved manual and computer analysis of resource information and the examination of interrelationships among resources.

4 An array of project alternatives was developed to implement the direction of theamended forest plan. These project alternatives needed to be responsive to issues and opportunities.

5. Management Area-wide Standards and Guidelines (Appendix F) were developed to supplement Forest-wide Standards and Guidelines. Together these standards and guidelines provide direction and mitigation for all management activities.

6. Prescriptions were developed to provide additional management direction in delineated project areas, as shown on Maps 6, 8, 10, 12, 14, and 16. They were designed to achieve a desired future condition in delineated areas where projects were proposed or where there was a specific concern or resource value that needs to be maintained.

Alternative Elements Considered but Eliminated from Detailed Consideration

In addition to the seven alternatives included in this FEIS, other approaches to implementing the amended forest plan were considered. They are described below, along with the reasons why they were not considered in detail.

Timber management on north Montague Island

This proposal would call for dispersed timber management over the entire island. The proposal was dropped because: (1) harvesting an economically-efficient volume of timber from both ends of the island would have required a volume much higher than that projected by the amended forest plan for this decade; (2) of potential adverse effects on fisheries, recreation, visual resources and deer winter range.

Timber management between Beach River and the north end of Montague Island

This alternative would have concentrated timber harvest along the eastern shore of Montague Island from Beach River to Zaikof Bay. It was dropped from consideration because of concerns for potential cumulative effects on wildlife habitat in the Beach River area from national forest and private land activities.

Timber management limited to the southeast side of Montague Island

This alternative would have concentrated timber harvest activities on the southeast side of the island between Deception Creek and the Nellie Martin River. This proposal would have best met the VQOs of the forest plan. However, this proposal was dropped because of potential cumulative effects to deer winter range from national forest and private land activities.

Proposals that would harvest less than approximately 20 mmbf of timber.

This proposal was dropped because it would be economically inefficient to harvest less than approximately 20 mmbf of timber, given the roading and mobilization costs that would be incurred for timber harvest on Montague Island under current conditions. This conclusion is supported by the results of the financial analysis of timber sale alternatives in the timber section of Chapter 4. This analysis shows that relative to the other alternatives, the Alternative 2 timber sale would still be a deficit sale even though

it concentrates timber harvest in the smallest possible area, requires the least amount of roading, and offers a volume of 20.9 mmbf.

Proposals that harvest more than 36 mmbf of timber from Montague Island

Timber harvest levels greater than 36 mmbf were considered to be economically-efficient but were dropped from further consideration because they exceed the projected harvest levels in the amended forest plan.

Withdrawal of lands from mineral entry

An alternative which considered the withdrawal of lands from mineral entry was not considered in detail because there are no known significant mineral resources in the management area.

Description of the Alternatives Including the Proposed Action

Alternative 1

Alternative 1 is the no action alternative. This alternative was developed to:

1. provide a base for measuring the effects of all other alternatives.

2..emphasize amended forest plan direction to maintain wildlife habitat and landscape character.

3. maintain the present recreation settings and experiences.

4. meet the "no action" requirement of NEPA.

Only maintenance activities would occur within the management area. Existing developments would be maintained in this alternative. None of the activities identified in the proposed action or other alternatives would be initiated.

Inventories to update or maintain the present knowledge of forest resources and their uses would continue. Currently approved activities for all resources are described below.

Special Uses

Unsolicited requests for new recreation special use permits or requests for expansion of existing recreation special use permits would be evaluated for their consistency with forest plan and management area direction with the appropriate NEPA analysis.

Access

The only activity that would occur would be limited to maintenance of existing system trails and public easements on Hinchinbrook and Montague islands.

Minerals Management

Operating plans for exploration or development would be considered.

Only those lands within the proposed research natural area including the southeast side of Green Island, all of Little Green Island, and The Needle would be considered for withdrawal from all appropriations, including mineral entry.

The Forest Service would assure that exploration and development of mineral resources would be carried out consistent with the amended forest plan and management area direction. The Forest Service would also require and process all operation plans, leases, permits and reclamation plans before any land-disturbing activities occur.

Fish and Wildlife

Routine maintenance of two fish passes and two stream channel stabilization projects would continue.

Feasibility studies would be completed on four potential fish habitat improvement sites (Figure 2-1, Map 2). The ongoing experimental chum salmon reintroduction on Montague Island would continue.

Timber

No timber management activities would occur.

Recreation

The Forest would emphasize developed and dispersed recreation opportunities as they currently exist. Routine maintenance of nine cabins would continue.

Inventories of recreation activities would continue to provide up-to-date data to be used for the forest plan revision.

Landscape Management

No alteration of the existing landscape would occur. The existing natural and roadless character of the national forest landscape would be maintained.

Research Natural Area

As proposed in the amended forest plan, a research natural area would be recommended for a portion of Green Island, Little Green Island, and The Needle.

Mitigation Measures

Forest plan standards and guidelines and appropriate Management Area-wide Standards and Guidelines consistent with no action would be implemented to meet the needs of a maintenance level of management.

Figure 2-1 Potential Fish Habitat Improvement Projects Feasibility Studies

Area	Type of Project	Estimated Output in lb per yr.	Alternative
MacLeod Harbor	Spawning Channel	69,950 pink/chum	2-6
Stump Lake Outlet	Lake Stabilization	N/A Coho/sockeye Dolly Varden Cutthroat	2-6
Chalmers River	Spawning Channel	14,570 Chum	2-6
Chalmers River Channel Overflow	Spawning Habitat Improvement	34,970 Pink/Chum	2-6
Jeanie Cove Stream Number 17836	Barrier Removal	550 Coho/Cutthroat	4-6
Jeanie Cove Stream Number 17838	Barrier Removal	1,100 Coho/Cutthroat	4-6
San Juan Bay Stream Number 16990	Steeppass	410 Coho	2-6
San Juan Bay Stream Number 17000	Rearing Ponds	13,700 Coho	2-6
Strike Creek	Rearing Habitat	6,850 Coho	4-6
Slide Creek	Channel Stabilization Rearing Habitat	9,970 Coho	4-6
MacLeod Harbor Number 17010	Fish Passage	33,130 Pink/Coho	4-6
MacLeod Harbor Number 17020	Channel Stabilization Spawning/Rearing Hab	13,220 Pink/Coho	2-6
Upper Nellie Martin Number 17790	Fish Passage	1,230 Coho	2-6
Upper Nellie Martin Number 17790	Barrier Removal	820 Coho	4-6

2 Alternatives

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

MONTAGUE ISLAND PORTION

FISH HABITAT ENHANCEMENT FEASIBILITY STUDY AREAS

with

Project ID Numbers



MAP 2

Monitoring

Monitoring would continue as presented in the amended forest plan. The Management Area-wide Standards and Guidelines (Appendix F) contain additional monitoring measures which would be implemented to validate the assumptions associated with the amended forest plan. Specific monitoring activities for management indicator species (MIS) are contained in Appendix C; however, the intensity of monitoring would be less than is displayed in Appendix C since no timber harvest or roading activities would occur.

Features Common to Alternatives 2 - 7

To reduce the length of alternative descriptions, activities which would be performed in all action alternatives are indicated below.

Special Uses

One of the issues identified during scoping was a need to determine what types and level of facilities and services would be allowed under special use permits. The Standards and Guidelines for the Big Islands Management Area provide guidance when considering special use permit applications. The special uses include outfitter/guides, lodges, tent platforms, subsistence camps, electronic and communication sites, temporary facilities and camps, refueling stations, aquaculture-related upland facilities, linear rights-of-way, etc.

Outfitter/Guide Carrying Capacity

Applications for overnight camps by outfitter/guides are frequently submitted to the forest. The location and number of these camps have the potential to alter the desired recreation setting specified in the forest plan goals through ROS objectives. Therefore, guidance on the number and location of outfitter/guide campsites is needed. An analysis of the management area, which considered current and potential recreation sites, determined an estimate of the social carrying capacity for potential outfitter/guide sites. This information is displayed in Figures 2-2 A-C. This estimated carrying capacity is applicable to all action alternatives.

The social carrying capacity was estimated area by area. (See Figures 2-2 A-C.) No additional carrying capacity was estimated for the south end of Montague Island, largely because the area already receives the most recreation use in relation to the remainder of the management area. Concurrently, the range of alternatives does not recommend projects which would alter use patterns in any area except south Montague Island. Proposed projects which might alter use patterns could require alternatives which have differing estimates for social carrying capacity. Since that is not the case, this estimate applies to all action alternatives. Additional detail on the analysis of social carrying capacity is found in Appendix B.

The estimated carrying capacity provides guidance to the district ranger as to how new outfitter/guide operations would fit into the social carrying capacity of a given area. This information can also be useful in directing applicants to areas where additional capacity exists. It is assumed that this social carrying capacity information would be used when considering special permit applications. Other standard requirements include:

1. Applicable State laws and licensing requirements;

2. Coordination with Alaska Department of Fish and Game;

3. NEPA requirements;

4. Recommendations from the state Prince William Sound area plan regarding types and locations of use;

5. Determination of public need for services and

6. Standard special use application requirements.

Figures 2-2 A-C display the existing and potential outfitter/guide capacity, potential recreation development sites, and non-outfitter/guide sites. North Montague Island has no outfitter/guide operations under permit, but has the potential for one hunting and one fishing site. South Montague Island has one hunting service which operates out of the special use lodge at MacLeod Harbor. Additional capacity includes the potential for one hunting operation at Hanning Bay. Green and Hawkins islands have no outfitter/guide operations under permit and no capacity was estimated for these islands. Hinchinbrook has three hunting and two fishing sites used by outfitter/guide operators. Other potential operations include four fishing sites and one hunting site.

Figure 2-2A Outfitter/Guide (O/G) Estimated Capacity, north Montague Island

north Montague	Current O/G Sites	Current Dev. Rec. Sites	Potential Dev. Rec. Sites	Potential O/G Sites	Other public Use "Sites"	Total # Sites
Zaikof Bay	0	0	1 cabin site *1 anchor buoy	0	4	5
Rocky Bay	0	Admin. Cabin	1 cabin site 1 anchor buoy	0	5	6
Stockdale	0	0	1 cabin site	1 hunting	3	5
Port Chalmers	0	1 rec. cabin non-FS buoy	1 anchor buoy	0	3	4
Lagoon South of Pt.Chalmers	0	0	1 cabin site	1 fishing	1	3

Coastal area between Lagoon and Hanning Bay does not have a demand for O/G services. Used by kayakers for camping. No capacity established at this time.

* = Project recommended in Management Area Analysis (MAA)

Figure 2-2B Outfitter/Guide (O/G) Estimated Capacity, south Montague Island and Green Island

south Montague	Current O/G Sites	Current Dev. Rec. Sites	Potential Dev. Rec. Sites	Potential O/G Sites	Other public Use "Sites"	Total # Sites
Hanning Bay	0	0	1 cabin site	1 hunting operation	4	6
MacLeod Harbor	1 hunting (Raymond)	Special Use Lodge	0	0	2	3
San Juan Bay	0	1 rec. cabin	*1 Tent Platform	0	2	4
Area between San Juan Bay and Jeanie Cove not used.						
Jeanie Cove	0	0	1 cabin site	0	4	6
Stump Lake	0	2 rec. cabins	0	0	1	3
Nellie Martin River	0	1 rec. cabin	1 cabin site *2 tent platforms	0	6	9
Beach River	0	1 rec. cabin	0	0	1	2
Coastal area between Beach River and Zaikof currently has no demand for O/G services. Very little recorded use.						
Green Island	0	1 rec. cabin	1 cabin site	0	5	7

* = Project recommended in Management Area Analysis (MAA)

Figure 2-2C Outfitter/Guide (O/G) Estimated Capacity, Hinchinbrook and Hawkins Island

Hinchinbrook	Current O/G Sites	Current Dev. Rec. Sites	Potential Dev. Rec. Sites	Potential O/G Sites	Other public Use "Sites"	Total # Sites
NW end Island Double Bay/ Anderson	0	1 rec. cabin	1	0	4	6
Shelter Bay	1 hunting 1 fishing	0	1 cabin site 1 anchor buoy	1 fishing	4	7
Deer Cove	0	1	1 cabin site 1 anchor buoy	0	2	4
Constantine Harbor/Port Etches and English Bay Garden Cove	1 fishing	0	1 cabin site 3 anchor buoys	1 hunting 3 fishing	12	16
Signal Mt. Ridge to Cliffs	1 hunting	0	0	0	2	3
Hook Point	0	1 rec. cabin	0	0	0	0
Boswell Bay	Mostly State and Eyak Corporation lands.					
Dan Bay	1 bear	0	0		3	4
Hawkins Island (entire island)	0	0	1 cabin site	0	3	4

Minerals Management

Under all alternatives, opportunities for mineral exploration and development would be permitted. Only those lands contained inside the proposed research natural area (Map 3) located on the southeast side of Green Island, all of Little Green Island, and the rock called The Needle (located about six miles southwest of Green Island) would be considered for withdrawal from all appropriations, including mineral entry.

Data gathered and analyzed by the Bureau of Mines and the U.S. Geological Survey (Fechner, 1988; Nelson et al., 1984) for this planning effort indicated low potential for developable mineral resources in the management area. The Forest Service would ensure that exploration and development of mineral resources would be carried out consistent with direction in the forest plan and that these activities would be integrated with the planning and management of other resources on the national forest through appropriate NEPA analysis and evaluation. The Forest Service would also require and process all operation plans, leases, permits and reclamation plans before any land-disturbing activities occur.

2 Alternatives

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA





Little Green Islands

PROPOSED RESEARCH NATURAL AREA

The Needle

0 1 2 3 4 MILES

MAP 3

Fish and Wildlife Management

The feasibility of mountain goat introduction on Montague Island would be explored in cooperation with the Alaska Department of Fish and Game.

Subunits, as used in the document (Map 4), are analogous to the hunt area subdivisions of the larger Game Management Unit 6 used by the Alaska Department of Fish and Game in summarizing information from the 1987 deer hunter harvest survey (Griese and Becker, 1988). Subunits 35, 36 and 37 encompass the entire area proposed for national forest and private timber harvest and roading activities on south Montague Island. Subunits are used in this document in the discussion of the alternatives, the affected environment and the effects of the implementation of the various alternatives for wildlife.

Forest wildlife and fish habitat capability would remain unchanged on Hawkins, Hinchinbrook, Green, Little Green islands, The Needle and in subunits 33, 34 and 38 on Montague Island.

Of the approximately 21,465 acres of mature productive forest (Map 17) on national forest lands on Montague Island (10,827 acres, south Montague), a minimum of 20,246 acres (9,608 acres, south Montague) would be maintained through the planning period and would provide habitat for mature forest dependent wildlife and fish species. Additional acres classified as suitable for timber harvest would be maintained through application of standards and guidelines for timber harvest in riparian areas (Appendix G). Timber harvest to the stream bank would not occur on anadromous fish streams.

Mature forest habitats would be maintained throughout the rotation for wildlife and fish species dependent on mature forest habitats in several ways. First, 885 acres on south Montague Island would be managed under prescriptive direction for wildlife habitat by not permitting timber harvest (Maps 6,8,10,12 and 14). Second, approximately 9,300 acres would provide wildlife and fish habitat through the rotation because of technical or economical unsuitability for timber harvest (Map 17). This number includes a minimum of 400 acres of braided channel fish habitat. Third, 65,000 acres (31,000 acres, south Montague) of unproductive forest land would provide lesser quality wildlife habitat (Map 17). In addition, a minimum of 1,235 acres of suitable mature productive forest land (191 acres, south Montague) would be managed under the Wildlife-Visual/Timber prescription (see Appendix G and Maps 6, 8, 10, 12 and 14) which emphasizes wildlife values.

The feasibility of mountain goat introduction on Montague Island would be explored in cooperation with the Alaska Department of Fish and Game.

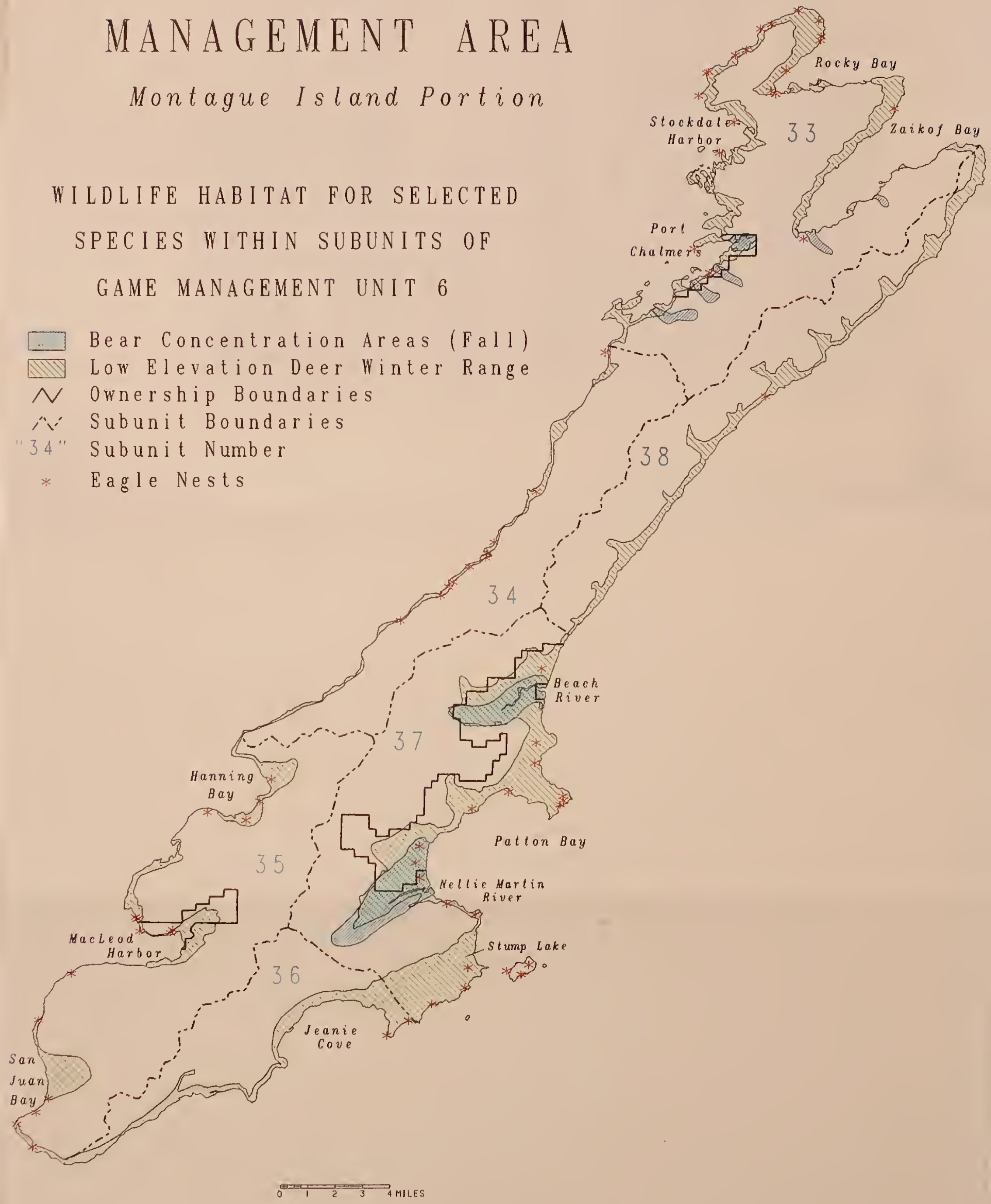
CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

WILDLIFE HABITAT FOR SELECTED SPECIES WITHIN SUBUNITS OF GAME MANAGEMENT UNIT 6

- Bear Concentration Areas (Fall)
- Low Elevation Deer Winter Range
- Ownership Boundaries
- Subunit Boundaries
- "34" Subunit Number
- * Eagle Nests



MAP 4

Timber Management

Precommercial thinning would occur on 1,968 acres of existing second growth timber located on the west side of Montague Island (Maps 5, 7, 9, 11 and 13). Twenty percent (400 acres) would be thinned under a timber production prescription to maximize wood fiber production with the remaining eighty percent (1,568 acres) to be thinned for the benefit of wildlife under a Wildlife-Visual/Timber prescription (Appendix G). The amended forest plan estimated 1,800 acres of precommercial thinning over the ten-year planning period. Based on current information, this acreage would be increased by 168 acres over the planning period.

The acreage of mature and over-mature stands to be harvested under Alternatives 2, 3, 4, 5 and 6 would be included in one timber sale. This sale would be offered in 1993. The 10-Year timber action schedule for the amended forest plan specified that an estimated volume of 36 mmbf would be scheduled in one timber sale located on Montague Island in fiscal year 1992. The interdisciplinary team reaffirmed offering the timber as a single sale based on the following assumptions:

-A single sale would be more efficient and economical to prepare and administer, given the logistics of getting the harvested timber from Montague Island to the nearest point of primary manufacture.

-Given the mobilization and transportation costs involved with logging and road building on Montague Island and the fact that the adjacent landowner plans to harvest timber on its lands, a sale offering larger volumes would be more likely to attract competitive bids.

Under Alternatives 2, 3, 4, 5 and 6, tractor yarding would only be allowed under frozen ground conditions with snow cover. Exceptions would be allowed on a case-by-case basis following on-the-ground inspection.

Recreation Management

In Alternatives 2 through 6, recreation cabins are proposed for construction in Shelter Bay on Hinchinbrook Island (Maps 5, 7, 9, 11, and 13) and Jeanie Cove on Montague Island. In addition, existing trails would be rehabilitated, 0.25 miles of trail constructed, and one anchor buoy installed on Montague Island. (Maps 5, 7, 9, 11 and 13.) Specific recreation projects proposed for each alternative are found in Figures 2-3 A through E.

In Alternatives 2 through 6 a public information program promoting low impact recreation techniques would be developed. In addition, all existing cabins would have food caching facilities added to them to reduce the risks of bear incidents.

A marine recreation prescription was assigned to Port Chalmers, Rocky Bay, Stockdale Harbor and Zaikof Bay (Map 6, 8, 10, 12 and 14).

Figure 2-3A Recreation Projects by Alternative within Big Islands Management Area

MONTAGUE ISLAND PROJECTS	ALTERNATIVE					
	1&7	2	3	4	5	6
GENERAL						
Public Information Program	-	X	X	X	X	X
ATV trail- MacLeod Harbor to Patton Bay (connects to road above Nellie Martin) 7 miles	-	-	-	-	7	-
Foot trail, nonmotorized - ridgeline from ATV trail above MacLeod Harbor to the connection at San Juan Bay 12 miles	-	-	-	-	12	-
MacLEOD HARBOR						
Boat launch facility 1	-	-	X	X	X	X
Boat launch facility 2	-	-	X	X	X	X
Airstrip improvement (FEASIBILITY STUDY)	-	X	X	X	X	X
Foot trail, nonmotorized -timber sale road to alpine (mi)			1.0	1.0	1.0	1.0
Trailhead parking for the above trail	-	-	X	X	X	X
Interpretive site - fish project	-	-	X	X	X	X
Campground, developed	-	-	-	-	20 unit	-

Figure 2-3B

MONTAGUE ISLAND PROJECTS	ALTERNATIVE					
SAN JUAN BAY	1&7	2	3	4	5	6
Move cabin	-	-	X	X	X	X
Tent platform, pad or shelter	-	-	X	X	shelter	X
Add food cache at cabin	-	X	X	X	X	X
Airstrip improvement (FEASIBILITY STUDY)	-	-	-	-	X	-
Boat launch facility	-	-	X	X	X	X
Foot trail - cabin to fishing stream (mi)		-	.5	.5	.5	.5
Foot trail - from NW corner of San Juan area (alpine)		-	1.0	1.0	1.0	1.0
Trailhead parking for the above trail	-	-	X	X	X	X
Foot trail - from SW corner of San Juan area (mi)		-	2.0	2.0	2.0	2.0
Trailhead parking	-	-	X	X	X	X
Interpretive site -timber/fisheries	-	-	X	X	X	X
Interpretive site -cultural	-	-	-	-	X	-

Figure 2-3C

	ALTERNATIVE					
JEANIE COVE	1&7	2	3	4	5	6
New cabin	-	X	X	X	X	X
Add food cache at cabin	-	X	X	X	X	X
Airstrip improvement (FEASIBILITY STUDY)	-	-	-	-	X	-
Foot trail, nonmotorized -cabin up Jeanie Creek (mi)	-	-	1.0	1.0	1.0	1.0
Trailhead parking (at road)	-	-	-	X	X	-
Foot trail, nonmotorized -road in Tortuous Cr. to alpine (mi)	-	-	-	1.0	1.0	-
Trailhead parking for above trail	-	-	-	X	X	-
Interpretive site -timber		-	-	X	X	-
STUMP LAKE						
Trail rehab. between cabins (mi)	-	1.5	1.5	1.5	1.5	1.5
Add food cache at cabin	-	X	X	X	X	X
Foot trail -cabin to beach (mi)	-	.25	.25	.25	.25	.25
Foot trail loop -Stump Lake to Patton Bay (mi)		-	-	5.0	5.0	5.0
Foot trail -connect loop trail with main road (mi)		-	-	2.0	2.0	-
Trailhead parking for Stump Lake trail		-	-	X	X	X
Foot trail -connect loop trail with spur road (mi)		-	-	-	-	1.0
Trailhead parking	-	-	-	-	-	X
Interpretive site -timber/fisheries	-	-	-	-	-	X

Figure 2-3D

MONTAGUE ISLAND PROJECTS	ALTERNATIVE					
NELLIE MARTIN RIVER	1&7	2	3	4	5	6
Airstrip improvement (FEASIBILITY STUDY)-		X	X	X	X	X
Tent platform, pad or shelter	-	-	-	2	2 shelters	2
Add food cache at cabin	-	X	X	X	X	X
Trail rehab -beach landing to cabin	-	.25	.25	.25	.25	.25
Foot bridge over N.Martin River (for loop tr listed under Stump Lake)	-	-	-	X	X	X
Recreation cabins dispersed along road, upper reaches of Nellie Martin River	-	-	-	-	3	-
Sportfishing trails (3) Upper Nellie Martin River north sportfishing trail	-	-	-	.25	.25	.25
Trailhead parking -fishing trail above	-	-	-	X	X	X
Sportfishing Trail	-	-	-	-	-	.5
Trailhead parking -fishing trail above	-	-		-	-	X
Sportfishing Trail	-	-	-	-	.25	.25
Trailhead parking (also ATV/Foot trail connection for alternative #5.)	-		-	-	X	-
BEACH RIVER						
Add food cache to cabins	-	X	X	X	X	X
Airstrip improvement (FEASIBILITY STUDY)-		-	-	-	X	-

Figure 2-3E

NORTH MONTAGUE ISLAND PROJECTS	ALTERNATIVE					
ZAIKOF BAY	1&7	2	3	4	5	6
New cabin	-	-	-	-	X	-
Anchor buoy		X	X	X	X	X
ROCKY BAY						
New cabin	-	-	-	-	X	-
PORT CHALMERS						
Add food cache at cabin		X	X	X	X	X
MONTAGUE LAGOON						
New cabin (FEASIBILITY STUDY)	-	-	-	-	X	-

GREEN ISLAND PROJECTS	ALTERNATIVES					
	1&7	2	3	4	5	6
Add food cache at cabins		X	X	X	X	X

HINCHINBROOK ISLAND PROJECTS						
SHELTER BAY						
New cabin	-	X	X	X	X	X
Add food cache at cabin	-	X	X	X	X	X
HOOK POINT						
Add food cache to cabin	-	X	X	X	X	X
DOUBLE BAY						
Add food cache to cabin	-	X	X	X	X	X

Landscape Management

In all alternatives visual resource needs were incorporated in the location of proposed projects.

Research Natural Area

As contained in the forest plan, a research natural area would be recommended for a portion of Green Island, Little Green Island, and The Needle as shown on Map 3.

Mitigating Measures

Mitigations are actions taken to offset or lessen real or potential unavoidable impacts of a management activity. The Council on Environmental Quality (CEQ) regulations state that mitigation includes:

1 Avoiding the impact altogether by not taking a certain action or parts of an action;

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;

3. Rectifying the impact by repairing, rehabilitating or restoring the affected environment;

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

5. Compensating for the impact by replacing or providing substitute resources or environments.

Site-specific project prescriptions contained in Appendix G are to be used as mitigating measures in the design and implementation of all proposed projects in Alternatives 2 through 7. Maps 6, 8, 10, 12, 14 and 16 display the geographic location of each prescription to the management of the land and resources under each respective alternative. The standards and guidelines contained within each prescription, supplement those contained in the Management Area-wide Standards and Guidelines (Appendix F). Forest-wide Standards and Guidelines contained in the amended forest plan would also be applied to project implementation and provide additional mitigation.

Fish and Wildlife

Mitigation methods recommended for the fish and wildlife resources in all action alternatives are to avoid the impact altogether by not taking an action and locating projects elsewhere, or to minimize impacts by limiting the degree or magnitude of the action and its implementation. Major areas that will be maintained for wildlife and fish species by avoiding an action are listed in the previous section describing Alternatives 2-7 and in following sections describing each alternative. Additional mitigation measures designed to avoid impacts of implementing the various projects on a more localized level are included in Appendix F (Management Area-wide Standards and Guidelines and Appendix G Prescriptions) and apply universally to all action alternatives.

Major mitigation measures designed to minimize impacts by limiting the degree or magnitude of the action are listed below. These measures and others are included in the Management Area-wide Standards and Guidelines (Appendix F) and also apply universally to all action alternatives. Some of the measures that are specific to timber harvest and recreation development are not directly applicable to Alternative 7.

Habitat for snag and cavity dependent wildlife would be managed as described in the Forest Plan. Measures include maintaining at least three hard snags per acre in stands within 150 feet of water or openings and two hard snags per acre in other areas. Consideration will also be given for leaving green trees for future snag recruitment, non-merchantable trees that show signs of heart-rot, and both soft and hard snags in areas protected by the wind. (See Appendix F.)

Impacts to the Prince William Sound Canada goose will be minimized by restricting development activities to periods when geese are absent from the area. Clearing of forests will be avoided within 330 feet of geese habitat when they are present during nesting, brood rearing, molting and wintering periods. Mitigation measures specific to the proposed harvest units for Alternatives 2 through 6 are described in Appendix H.

All existing eagle nest trees would be protected by maintaining a 330-foot undisturbed windfirm zone around each nest as described in the forest plan. Additional measures as described in Appendix F would provide for the maintenance of additional trees for roosting and future nesting. Mitigation measures specific to the proposed harvest and thinning units for Alternatives 2 through 6 are described in Appendix H.

Impacts to brown bear from increased human use will be reduced through seasonal closure of roads and trails as necessary, requirements for bear-proof garbage facilities at logging camps and large scale recreation facilities and the initiation of a "Pack it In, Pack it Out" program. Bear-proof food caches will be installed at all recreation cabins. More restrictive harvest regulations will likely be imposed by the Alaska Department of Fish and Game.

Potential impacts to anadromous and resident fish, as well as riparian dependent wildlife species, would be avoided or reduced through the application of the Management Area-wide Standards and Guidelines for timber harvest, road and bridge construction, trail construction, recreation developments and pit and quarry development in aquatic habitat management units (Appendix F). These mitigation measures are designed to maintain the existing levels of large woody debris (LWD), provide for future sources of LWD, maintain in-stream cover, maintain stream bank stability, provide fish passage where necessary, maintain existing spawning and rearing habitat, minimize sedimentation and control the timing of in-stream and stream-side activities. Timber harvest to the stream-bank would not occur on any anadromous fish stream. Mitigation measures specific to the proposed harvest units for Alternatives 2 through 6 are discribed in Appendix H.

Impacts to wildlife and fish species from precommercial thinning activities would be reduced by emphasizing improvement of wildlife habitat values on 80 percent of the acres (1,568 acres) proposed for treatment. The major impetus would be to prolong and/or increase the forage value of second growth stands for wintering deer and to develop the characteristics of a mature forest earlier than would naturally occur in terms of snow interception and forage production. Thinning would occur to an average tree spacing between 16-20 feet, small unthinned clumps of healthy trees would be maintained and corridors and small openings would be created or maintained in ap-

proximately 10 percent of the stand. All slash would be lopped and scattered in corridors and openings to lie within two feet of the ground. Alder immediately adjacent to streams would be managed to provide 75 percent shade on the stream and the complete canopy would be removed only along stream sections with abundant instream cover. Mitigation measures specific to the proposed thinning units for Alternatives 2 through 6 are described in Appendix H.

Recreation

For the recreation resource, the most effective and most often recommended mitigation for the proposed activities in the action alternatives is avoiding the impact altogether by not taking an action, i.e. locating the project elsewhere. Figures 2-4 A and B summarize recreation mitigation measures.

For all action alternatives, in regard to three of the four key recreation complexes (Jeanie Cove, Stump Lake and Nellie Martin River), mitigation for the arterial road is to avoid the area, with the exception of Jeanie Cove in Alternative 6. The fourth area, San Juan Bay is not mitigated for the road in any of the action alternatives.

Mitigation for harvest activities in three of four key recreation areas (same three as above) is to avoid the area in all action alternatives. For the fourth area, San Juan Bay, all action alternatives except 7 recommend harvest activities within the recreation setting for this area.

Another mitigation method is to limit the degree or magnitude of the action. Alternatives 2 through 6 propose some configuration and some number of harvest units within the San Juan Bay area. All of these proposed actions impact the recreation setting to some degree. Mitigation minimizes this impact to varying degrees by the application of standards and guidelines for maintaining visual quality and through careful selection of harvest units and their placement. Other more effective mitigation measures for recreation were not used in San Juan Bay so that fish and wildlife habitat would be protected.

Potential impacts to soil and water quality from construction and use of trails are minimized by adherence to the Management Area-wide Standards and Guidelines for trail construction and maintenance.

Impacts from increased visitor use as a result of new recreation development include some resource degradation from improper disposal of human waste, minor soil compaction in non-beach camping areas and increased litter, e.g. cans, bottles, food, remains of carcasses of game animals and general trash.

Alternatives 2 through 6 propose activities which would increase use and since some concerns were expressed by the public as to potential resource degradation and additional litter resulting from increased visitor use, the following projects are proposed and included in Alternatives 2 through 6:

1.Develop an information and education program which focuses on low impact techniques for recreation visitor use in eastern Prince William Sound. Possible facets of the program are the development of a brochure and/or video on the subject, development of a cadre of speakers to present programs to user groups on the subject (environmental, hunting, fishing, marine recreation and school groups), development of a cadre of volunteers to help spread the word through visitor contacts during the high use season

and use of partnerships to fully develop and implement the program. For example, several organized user groups have expressed interest in developing such a program directed at kayakers and small boaters. Such a program could add to the experience gained from the 1988 cooperative projects with the Prince William Sound Users Association which helped to accomplish patrols in the sound.

2. Fully implement the "Pack it In, Pack it Out" Forest Service program in eastern Prince William Sound which encourages users to take out their own refuse. No garbage facilities are planned for existing or proposed developed recreation facilities (except in large scale facilities proposed in Alternative 5) or for dispersed areas. The program could be extended to include the air charter pilots who transport visitors to and from the area.

Figure 2-4A Recreation Resource Concerns Regarding the Arterial Road, Mitigation Measures and Estimated Effectiveness by Alternative

KEY REC. COMPLEXES		ALTERNATIVE 1	2	3	4	5	6	7
SAN JUAN BAY AREA (rec. cabin) Semi-primitve Nonmotorized	CONCERN	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.
	MITIGATION	No Road	NONE	NONE	NONE	NONE	NONE	NONE
	EFFECTIVENESS	High	Low	Low	Low	Low	Low	Low
JEANIE COVE AREA (potential rec. cabin) PRIMITIVE	CONCERN	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.
	MITIGATION	No Road	Avoid Area	Avoid Area	Avoid Area	Avoid Area	None	Avoid Area
	EFFECTIVENESS	High	High	High	High	High	Low	High
STUMP LAKE (2 rec. cabins) PRIMITIVE	CONCERN	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.
	MITIGATION	No Road	Avoid Area	Avoid Area	Avoid Area	Avoid Area	Avoid Area	Avoid Area
	EFFECTIVENESS	High	High	High	High	High	High	High
NELLIE MARTIN (rec. cabin) Semi-primitive Nonmotorized	CONCERN	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.	Road location too close to cabin. Maintain desired rec. setting.
	MITIGATION	No Road	Avoid Area	Avoid Area	Road located away from immediate area of cabin	Road located away from immediate area of cabin	Road located away from immediate area of cabin	Road located away from immediate area of cabin
	EFFECTIVENESS	High	High	High	Moderate	Moderate	Moderate	Moderate

HIGH denotes almost certain 100% effective MODERATE denotes greater than 75% effective LOW denotes less than 75% effective

Figure 2-4B Recreation Resource Concerns Regarding Harvest Units, Mitigation Measures and Estimated Effectiveness by Alternative

KEY REC. COMPLEXES	ALTERNATIVE	1	2	3	4	5	6	7
SAN JUAN BAY AREA (rec. cabin) Semi-primitive Nonmotorized	CONCERN	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.
	MITIGATION	No harvest	Fewer harvest units & no harvest on north side of bay.	Some application of Partial Retention (visual) S&G	Fewer (8) harvest units	Some application of Partial Retention (visual) S&G	Some application of Partial Retention (visual) S&G	No Harvest
	EFFECTIVENESS	High	Moderate	Low	Moderate	Low	Low	High
JEANIE COVE AREA (potential rec. cabin) PRIMITIVE	CONCERN	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.
	MITIGATION	No Harvest	No harvest	No Harvest	No Harvest	No Harvest	No Harvest	No Harvest
	EFFECTIVENESS	High	High	High	High	High	High	High
STUMP LAKE (2 rec. cabins) PRIMITIVE	CONCERN	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.
	MITIGATION	No Harvest	No harvest	No Harvest	No Harvest	No Harvest	No Harvest	No Harvest
	EFFECTIVENESS	High	High	High	High	High	High	High
NELLIE MARTIN (Rec. cabin) Semi-primitive Nonmotorized	CONCERN	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.	Maintain desired rec. setting.
	MITIGATION	No Harvest	No harvest	No Harvest	No Harvest	No Harvest	No Harvest	No Harvest
	EFFECTIVENESS	High	High	High	High	High	High	High

HIGH denotes almost 100% effective.

MODERATE denotes greater than 75% effective

LOW denotes less than 75% effective

Timber

For Alternatives 2 through 6, site-specific resource concerns that could be identified from aerial photos or on-the-ground knowledge of the area have been identified for each harvest unit and precommercial thinning location. These concerns are listed by alternative in Appendix H.

For each alternative, specific mitigation measures to be applied in each stand or harvest unit that mitigate the specified concern are also listed in Appendix H with a corresponding estimate of mitigation effectiveness.

Resource concerns, mitigation measures and estimates of mitigation effectiveness are based on resource specialists' review of the aerial photos showing intended harvest unit or precommercial thinning locations and on their knowledge of the area. Some minor changes in individual harvest unit or thinning locations may occur due to undetectable ground conditions that will affect road, setting and unit boundary locations. Field layout of each harvest unit or stand for precommercial thinning will involve consultation with the appropriate resource specialist having a resource concern in the mitigation figures in Appendix H for that harvest unit or stand. All specialists will review each unit before finalizing the layout to assure no significant change in impacts has occurred during field layout. If necessary, additional mitigation measures will be designated when the unit or stand is laid out on the ground.

Under all action alternatives, it is assumed that proper design and layout of harvest units using established standards and guidelines contained in this document will be effective in establishing windfirm boundaries so as to minimize the potential for windthrown timber in adjacent unharvested stands.

Soil and Water

Forest-wide and Management Area-wide Standards and Guidelines (Appendix F) for soil and water and the Forest Service Alaska Region (Region 10) Handbook on Best Management Practices for Watersheds 1/ provide mitigation measures that apply universally to all timber management activities, road construction, recreation development and fisheries projects in the action alternatives. In addition, site-specific concerns, mitigation measures, and estimates of mitigation effectiveness for timber harvest units and precommercial thinning locations are listed in Appendix H by alternative under the soil and water resource headings.

1/USDA-R10, "Best Management Practices (BMP) for Protection of Water Quality from Nonpoint Sources of Pollution", DRAFT dated November 23, 1988.

Effectiveness of Mitigation

Wildlife and Fish

Mitigation measures which avoid impacts by not taking an action or locating projects elsewhere are highly effective in maintaining wildlife and fish habitat capability in the management area. Most species are dependent on the existing mature forest habitats. Wildlife and fish habitat on Hawkins, Hinchinbrook, and Green islands as well as north Montague Island, the peninsula between Jeanie Cove and Patton Bay on south Montague Island would be maintained in their current condition under all alternatives. Each alternative avoids impacts in specific areas. The description of each alternative lists specific areas in which impacts are avoided by not locating projects in those areas. No further discussion is included under each alternative as to the effectiveness of avoiding an action as all such actions are assumed to be highly effective.

Figure 2-5 summarizes the relative effectiveness of the proposed mitigation measures. Mitigation measures designed to minimize or reduce the level of impacts are applied universally to all action alternatives. Some of the measures are specific to timber harvest activities and are not directly applicable to Alternative 7.

Figure 2-5 Fish and Wildlife Mitigation Effectiveness

Mitigation	Species	Effectiveness *
Locating Projects Elsewhere	All	High
Disturbance Zone	Goose	Moderate
Snag Retention	Cavity nesters	Low
Protect Existing Nest Trees	Eagles	High
Retain Trees For Roosting/Nesting	Eagles	Low
Food/Garbage Storage	Brown Bear	Low
Restricted Harvest		
Seasonal Road Closures		
Aquatic Habitat Management Unit		
Harvest and Roading Guidelines	Fish	High
Precommercial Thinn ing Guideline s	Deer Bear/Fish	Low

* High - almost 100 percent effective

Moderate - greater than 75 percent effective

Low - less than 75 percent effective

Effectiveness of mitigation measures specific to proposed harvest units is described in Appendix H.

Recreation

The proposed road and timber harvest activities on National Forest System lands potentially impact the recreation resource. The greatest potential for impact is to the recreation setting of the four significant recreation complexes on south Montague Island. Figures 2-4 A and B summarize the effectiveness of mitigation measures recommended for all alternatives. The probability of implementing the mitigation measures as planned is high.

For three of these areas affected by the proposed road and/or timber harvest activities (Jeanie Cove, Stump Lake and Nellie Martin River), direct impacts are mitigated by avoiding projects in these areas in all alternatives, with one exception. The exception is the road location in Jeanie Cove for Alternative 6. This is not mitigated in Alternative 6 and has a low effectiveness rating. Definitions of high, medium and low effectiveness are found in Figures 2-4 A and B. Avoiding the area as a mitigation measure is rated as high in effectiveness. The fourth area, San Juan Bay, is not mitigated for impacts from the road location in any of the alternatives.

In addition, the recreation setting is adversely impacted by harvest units and their locations. The degree of impact varies depending on the location of the harvest units. More effective mitigation measures for impacts to the recreation setting are not recommended so that fish and wildlife habitat is protected. The Visual Resource section contains additional detail on specific impacts to the visual setting. For timber harvest activities in San Juan Bay, the effectiveness of mitigation is rated high for Alternatives 1 and 7, moderate for Alternatives 2 and 4 and low for Alternatives 3, 5 and 6.

Potential impacts from increased visitor use as a result of new recreation development include some resource degradation from improper disposal of human waste and minor soil compaction in non-beach camping areas and increased litter of all types including cans, bottles, food, remains of carcasses of game animals and general trash.

Mitigation of these potential impacts include two projects: 1) development and implementation of an information and education program on low impact techniques aimed at users of Prince William Sound and 2) make the "Pack it In, Pack it Out" program fully operational. This program is aimed at encouraging users to pack out all items (trash included) that they bring to the sound since there is no trash pick up scheduled for the islands. The effectiveness is rated moderate for the first project and low for the second project. The probability of these programs being implemented is dependent on whether they are specifically budgeted.

Soil and Water

Implementation of Best Management Practices and soil and water Standards and Guidelines for the proposed activities in timber, roads, recreation and fisheries is expected to effectively mitigate potential impacts to the soil and water resources. Even with implementation of the practices, minor soil erosion and a temporary decrease in water quality may be expected for short periods during the initial construction of strategic portions of the roads and selected fisheries projects. The predicted effectiveness of site-specific soil and water mitigation measures for all timber management activities is listed in Appendix H by alternative.

Alternative 2

During the planning period, Alternative 2 (Maps 5 and 6) concentrates most resource development in the management area between MacLeod Harbor and San Juan Bay on Montague Island. This alternative was developed to:

1. separate Forest Service management from private land management and minimize the cumulative effects of timber management in the Nellie Martin River area;

2. maintain and enhance high-value fish and wildlife habitat capability;

3. supply timber to local industry consistent with other resource objectives;

4. maintain the present recreational experience by minimal investments in the recreation developments and concentrating additional investments in the rehabilitation of existing facilities.

Forest management activities proposed in this alternative are at or below those levels identified in the amended Forest Plan. The emphasis is to focus all vegetative management activities away from planned timber harvests on private lands located at Patton Bay and Beach River. Under this alternative, a mix of projects (Figure 2-6) would be approved for implementation.

Access

The transportation system (Map 5) would only serve Chugach National Forest resources. It would be constructed with an emphasis on the southwest part of Montague Island between MacLeod Harbor and San Juan Bay to accommodate resource development and public use. It would consist of:

* 38.6 miles of roads
* 0.25 miles of nonmotorized trails
* 2 airstrip feasibility studies
* 1 anchor buoy
* 1 log transfer facility

The road system between MacLeod Harbor and San Juan Bay would consist of 11.6 miles of arterial, 1.9 miles of collector, 16.8 miles of local, and 8.3 miles of temporary roads.

The log transfer facility would be located on the south side of MacLeod Harbor on public land.

Airstrip feasibility studies would be conducted at MacLeod Harbor and Nellie Martin River areas.

A nonmotorized trail would be constructed at Stump Lake.

One anchor buoy would be installed in Zaikof Bay.

Fish and Wildlife

Habitat capability on the southeast side of Montague Island (subunits 36 and 37 on Map 2) would not be changed. Important south aspect deer winter range habitat (Map 4) in the San Juan Bay drainage would be maintained.

Suitable forest land on south aspects on the southeast side of Montague Island and in the San Juan Bay drainage would be managed with an emphasis on wildlife protection (Map 6).

Wildlife and fish habitat would be maintained in San Juan Bay and Nellie Martin River priority #1 Stream Habitat Zones (Map 19). The habitat would be maintained by avoiding any ground-disturbing activities in these areas.

Feasibility studies would be completed for eight potential fish habitat improvement sites (Figure 2-1 and Map 5). An estimated 201,400 pounds of fish would be produced annually if all projects were found feasible and were implemented.

Timber

Approximately 777 acres of land suitable for timber management within the south Montague Island project area would be harvested during the planning period using the clearcut regeneration system. All stands to be harvested are Sitka spruce or hemlock/Sitka spruce stands and contain an estimated sawtimber volume of 20.9 mmbf.

Of the harvest acreage, 97 percent would be harvested by conventional highlead cable systems. The remaining 3 percent would be harvested by tractor. Harvest unit size ranges from 6 to 58 acres with an average size of 24 acres.

In terms of national forest land suitable for timber management on Montague Island and in the management area, the area that would be harvested during the planning period is 3.6 percent and 1.2 percent respectively.

Recreation

Visitor use levels would increase eight percent, primarily due to improved access resulting from the road system between MacLeod Harbor and San Juan Bay.

New recreation facilities (Map 5) would include cabins at Jeanie Cove on Montague Island and Shelter Bay on Hinchinbrook Island. A complete listing of proposed recreation projects is found in Figures 2-3 A through E.

Mitigation Measures Specfic to Alternative 2

In addition to the mitigating measures described under features common to Alternatives 2 through 7, site-specific mitigation measures to be applied to individual harvest units for Alternative 2 (Map 5) are contained in Appendix H.

Monitoring Specific to Alternative 2

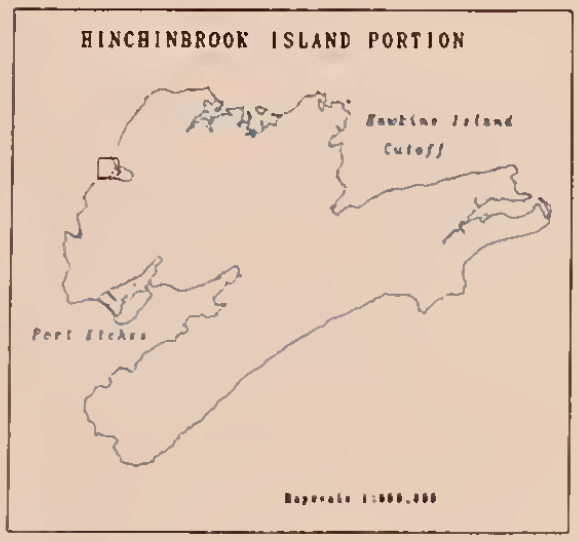
None

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 2



Rocky Bay
Stockdale Harbor
Zaikof Bay
Port Chalmers
Beach River
Hanning Bay
Patton Bay
Nellie Martin River
Stump Lake
MacLeod Harbor
Jeanie Cove
San Juan Bay

0 1 2 3 4 MILES

PROPOSED PROJECTS

- Final Harvest - Stand Clearcut
- Precommercial Thin
- Lakes
- Ownership Boundaries
- Roads
- Airstrip Improvement*
- Recreation Trail
- Fishery Enhancement Site*
- Recreation Cabin
- Anchor Buoy
- Tent Platform
- Log Transfer Facility

* *Feasibility Study*

MAP 5

CHUGACH NATIONAL FOREST

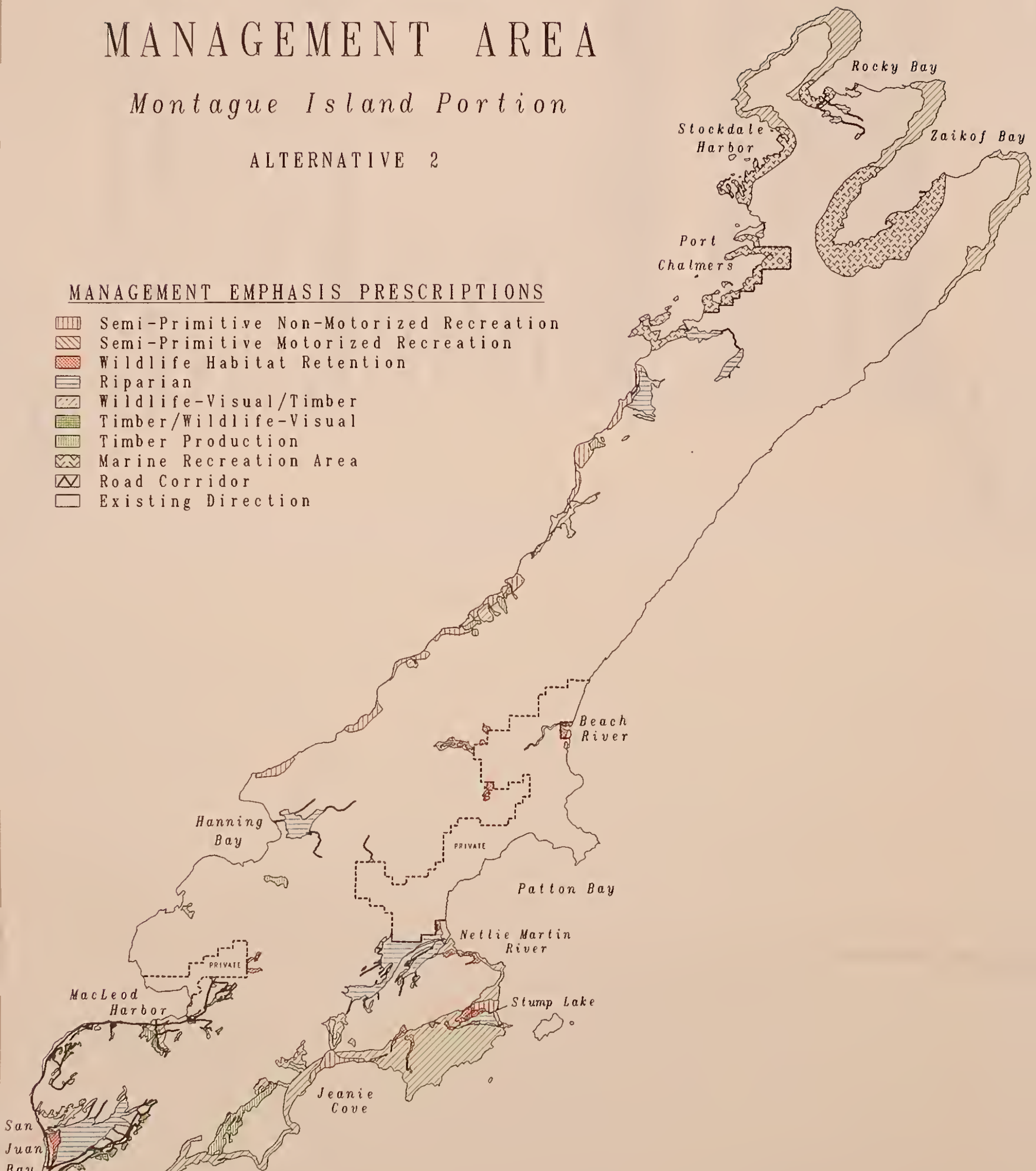
BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 2

MANAGEMENT EMPHASIS PRESCRIPTIONS

- Semi-Primitive Non-Motorized Recreation
- Semi-Primitive Motorized Recreation
- Wildlife Habitat Retention
- Riparian
- Wildlife-Visual/Timber
- Timber/Wildlife-Visual
- Timber Production
- Marine Recreation Area
- Road Corridor
- Existing Direction



MAP 6

Alternative 3

During the planning period, Alternative 3 (Maps 7 and 8) concentrates most of the management area resource development between MacLeod Harbor and San Juan Bay on Montague Island. This alternative was developed to:

1. separate Forest Service management from private land management and minimize the cumulative effects of timber management in the Nellie Martin River area;

2. maintain and enhance high-value fish and wildlife habitat capability;

3. produce a high level of timber for local industry;

4. provide a more developed recreation experience by adding new recreation facilities and by taking advantage of opportunities to combine access needs or timber management and recreation development.

Access

The transportation system would serve only Chugach National Forest resources. It would be constructed with an emphasis on the southwest part of Montague Island between MacLeod Harbor and San Juan Bay to accommodate resource development and public use (Map 7). It would consist of:

* 46.0 miles of roads
* 6 miles of nonmotorized trails
* 2 airstrip feasibility studies
* 2 trailhead parking areas
* 1 anchor buoy
* 3 saltwater access points
* 1 log transfer facility

The road system between MacLeod Harbor and San Juan Bay would consist of 11.6 miles of arterial, 2.9 miles of collector, 22.0 miles of local, and 9.5 miles of temporary roads.

The log transfer facility would be located on the south side of MacLeod Harbor.

Airstrip feasibility studies would be conducted at MacLeod Harbor and Nellie Martin River areas.

One anchor buoy would be installed in Zaikof Bay.

Hunters and hikers would have improved access to alpine areas on the south end of Montague Island above MacLeod Harbor and San Juan Bay.

Saltwater access (shown as boat launching facility on maps) would be provided at MacLeod Harbor and San Juan Bay.

Six miles of nonmotorized trail would be constructed in the MacLeod Harbor, San Juan Bay, Jeanie Cove, and Stump Lake areas.

Opportunities for four-wheel drive vehicle and all-terrain vehicle use are increased because of increased roading in the MacLeod Harbor/San Juan Bay areas.

Trailhead parking areas would be provided in the MacLeod Harbor and San Juan Bay areas.

Fish and Wildlife

No timber harvest is proposed in subunits 36 and 37 (Map 2) to maintain mature forest wildlife habitat on the southeast side of Montague Island.

Wildlife and fish habitat in the Nellie Martin River priority #1 Stream Habitat Zone (Map 19) would be maintained by avoiding any ground-disturbing activity in this area. Harvest in San Juan River priority #1 Stream Habitat Zone would be limited to areas without substantial braided channel habitat.

Studies would be completed for eight potential fish habitat improvement sites (Figure 2-1 and Map 7). An estimated 201,400 pounds of fish would be produced annually if all projects were found feasible and were implemented.

Timber

Approximately 1,014 acres of land suitable for timber management within the south Montague Island project area would be harvested during the planning period using the clearcut regeneration system. All stands to be harvested are Sitka spruce or hemlock/Sitka spruce stands and contain an estimated sawtimber volume of 30.9 mmbf.

Of the harvest acreage, 88 percent would be harvested by conventional highlead cable systems. The remaining 12 percent would be harvested by tractor. Harvest unit size ranges from 6 to 60 acres with an average size of 27 acres.

In terms of national forest land suitable for timber management on Montague Island and in the management area, the area that would be harvested during the planning period is 4.7 percent and 1.6 percent respectively.

Recreation

Visitor use levels would be expected to increase 15 percent over present use.

In addition to those cabins proposed in Alternative 2, new recreation facilities would include installation of a tent platform, pad, or shelter at San Juan Bay and interpretive sites at MacLeod Harbor and San Juan Bay (Map 7). A complete listing of recreation projects is included in Figures 2-3 A through E.

Mitigation Measures Specific to Alternative 3

In addition to mitigating measures described under features common to Alternatives 2 through 7, site-specific mitigation measures to be applied to individual harvest units for Alternative 3 (Map 7) is contained in Appendix H.

Monitoring Specific to Alternative 3

None

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 3



Rocky Bay
Stockdale Harbor
Zaikof Bay
Port Chalmers
Beach River
Hanning Bay
Patton Bay
Nellie Martin River
Stump Lake
MacLeod Harbor
Jeanie Cove
San Juan Bay

0 1 2 3 4 MILES

PROPOSED PROJECTS

- Final Harvest - Stand Clearcut
- Precommercial Thin
- Lakes
- Ownership Boundaries
- Roads
- Airstrip Improvement*
- Recreation Trail
- ATV Road or Trail
- Fishery Enhancement Site*
- Family Campground
- Recreation Cabin
- Recreation Cabin*
- Anchor Buoy
- Tent Platform
- Interpretive Site
- Trailhead
- Boat Launching Facility
- Log Transfer Facility

* *Feasibility Study*

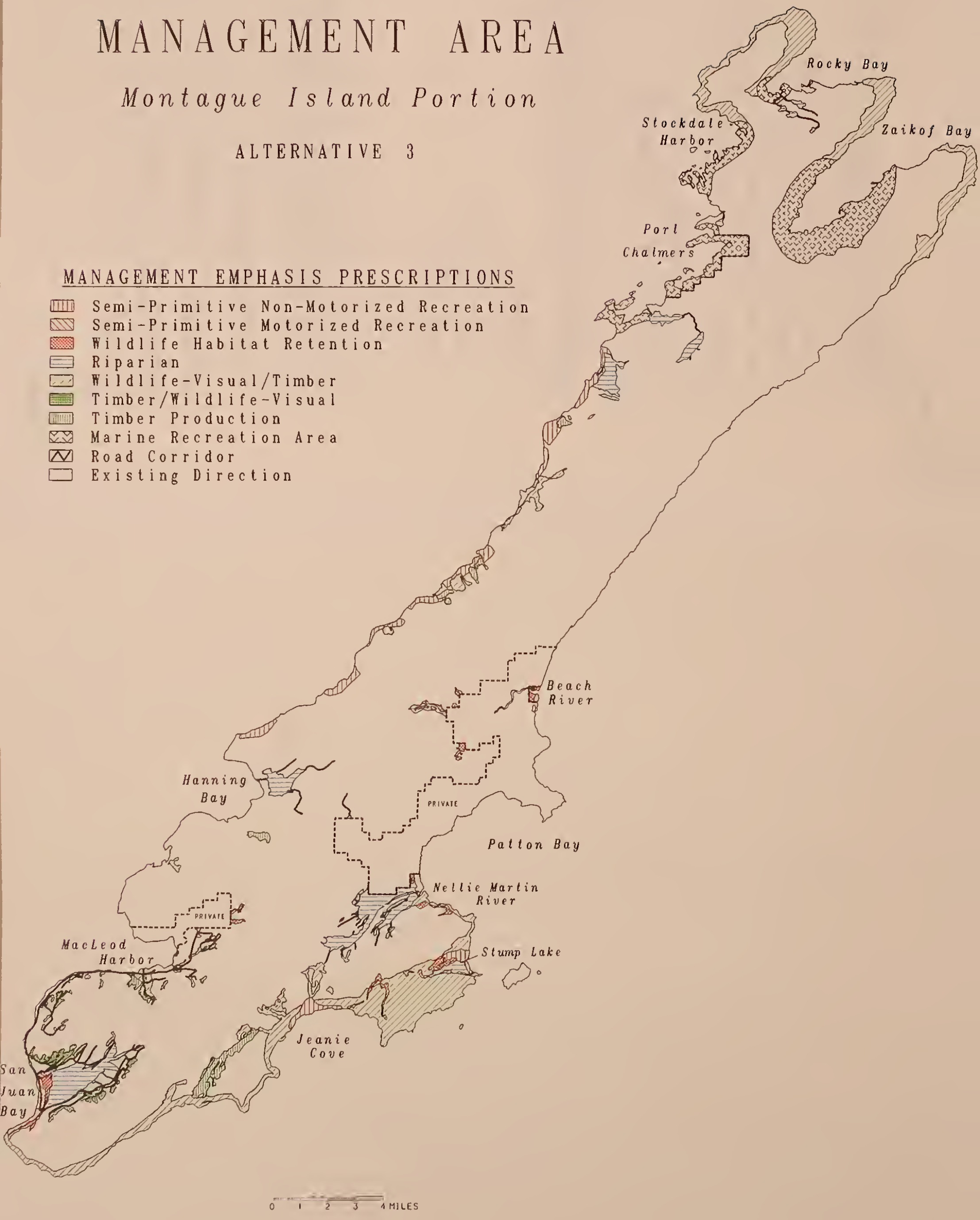
MAP 7

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 3



MAP 8

Alternative 4

During the planning period, Alternative 4 (Maps 9 and 10) disperses forest management activities around the southern end of Montague Island from MacLeod Harbor to Patton Bay. This alternative was developed to:

1. coordinate access to meet national forest and private needs;

2. disperse activities to maintain fish and wildlife habitat capability;

3. limit the cumulative effects of timber management in the Nellie Martin River area;

4. produce a volume of timber harvest consistent with other objectives to supply local industry;

5. increase road and trail-related recreation opportunities;

6. enhance commercial and sport fisheries opportunities.

Access

The transportation system (Map 9) would be expanded with an emphasis on the south end of Montague Island to accommodate resource development and public use. This consists of:

* 57.6 miles of roads
* 14 miles of nonmotorized trails
* 2 airstrip feasibility studies
* 6 trailhead parking areas
* 1 anchor buoy
* 3 saltwater access points

The road system would connect private land at MacLeod Harbor to private land at Patton Bay across National Forest System land. It would consist of 34.5 miles of arterial, 2.9 miles of collector, 13.4 miles of local and 6.8 miles of temporary roads. The arterial road would be constructed under a cost-share agreement between the Forest Service and Chugach Alaska Corporation (CAC).

Development of the arterial road could be implemented independent of proposed national forest activity and without Forest Service participation in funding.

A log transfer facility would be located on private land on the north side of MacLeod Harbor and would serve both national forest and private landowner needs.

Nonmotorized trails would be constructed in the MacLeod Harbor, San Juan Bay, Jeanie Cove, Stump Lake and Nellie Martin River areas.

Airstrip feasibility studies would be conducted for sites in MacLeod Harbor and Patton Bay.

One anchor buoy would be installed at Zaikof Bay.

Trailhead parking areas would be constructed at MacLeod Harbor, San Juan Bay, Jeanie Cove and Stump Lake.

Saltwater access (shown as boat launching facility on maps) would be provided at MacLeod Harbor and San Juan Bay.

Fish and Wildlife

Timber management would occur with the emphasis on maintaining fish and wildlife habitat capability on the southwest side of Montague Island (subunit 35) and in the Nellie Martin River drainage (subunit 37) (Map 2).

No timber harvest or roading would occur in high-value, low-elevation deer winter range in Jeanie Cove. Wildlife and fish habitat capability would be maintained in the San Juan River and Nellie Martin River priority #1 Stream Habitat Zones (Map 19) by avoiding ground-disturbing activities in those areas.

Studies would be completed for 14 potential fish habitat improvement sites (Figure 2-1 and Map 9). An estimated 221,700 pounds of fish would be produced annually if all projects were found feasible and were implemented.

Timber

Approximately 999 acres of land suitable for timber management within the south Montague Island project area would be harvested during the planning period using the clearcut regeneration system. All stands to be harvested are Sitka spruce or hemlock/Sitka spruce stands and contain an estimated sawtimber volume of 28.6 mmbf.

Of the harvest acreage, 65 percent would be harvested by conventional highlead cable systems. The remaining 35 percent would be harvested by tractor. Harvest unit size ranges from 11 to 85 acres with an average size of 37 acres.

In terms of national forest land suitable for timber management on Montague Island and in the management area, the area that would be harvested during the planning period is 4.6 percent and 1.6 percent respectively.

Recreation

This alternative provides for more developed recreation than Alternatives 2 and 3. This would be accomplished by integrating access needs for timber management and recreation development from MacLeod Harbor to Patton Bay.

Visitor use levels would increase approximately 25 percent more than current levels as a result of additional road access and trails. A nonmotorized trail from Stump Lake to Nellie Martin River and foot trails from cabins at Stump Lake and Jeanie Cove connecting to the arterial road would provide hiking, fishing, hunting, photography and other opportunities for enjoying the south end of Montague Island.

Opportunities for interpretation are presented by resource management activities at MacLeod Harbor and San Juan Bay.

In addition to the recreation projects in Alternative 3, this alternative would develop two tent platforms, pads or shelters in the Nellie Martin River area and an additional interpretive site at Jeanie Cove (Map 9). A complete listing of proposed recreation projects is found in Figures 2-3 A through E.

Mitigation Measures Specific to Alternative 4

In addition to mitigating measures described under features common to Alternatives 2 through 7, site-specific mitigation measures to be applied to individual harvest units for Alternative 4 (Map 9) are contained in Appendix H.

Monitoring Specific to Alternative 4

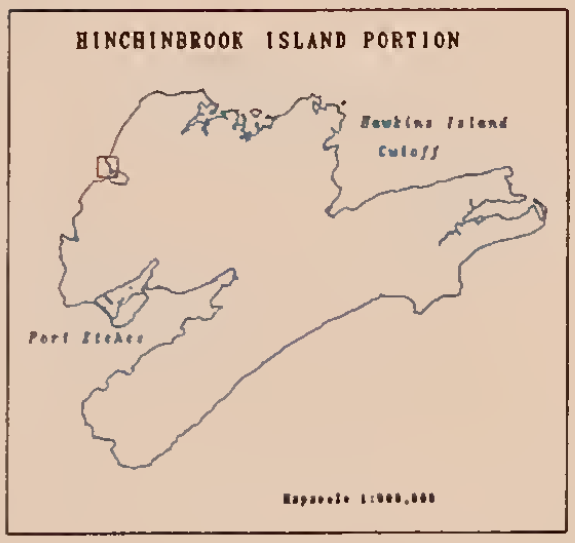
None

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 4



Rocky Bay
Stockdale Harbor
Zaikof Bay
Port Chalmers
Beach River
Hanning Bay
Patton Bay
Nellie Martin River
Stump Lake
MacLeod Harbor
Jeanie Cove
San Juan Bay
0 1 2 3 4 MILES

PROPOSED PROJECTS

- Final Harvest - Stand Clearcut
- Precommercial Thin
- Lakes
- Ownership Boundaries
- Roads
- Airstrip Improvement*
- Recreation Trail
- ATV Road or Trail
- Fishery Enhancement Site*
- Family Campground
- Recreation Cabin
- Recreation Cabin*
- Anchor Buoy
- Tent Platform
- Interpretive Site
- Trailhead
- Boat Launching Facility
- Log Transfer Facility

* *Feasibility Study*

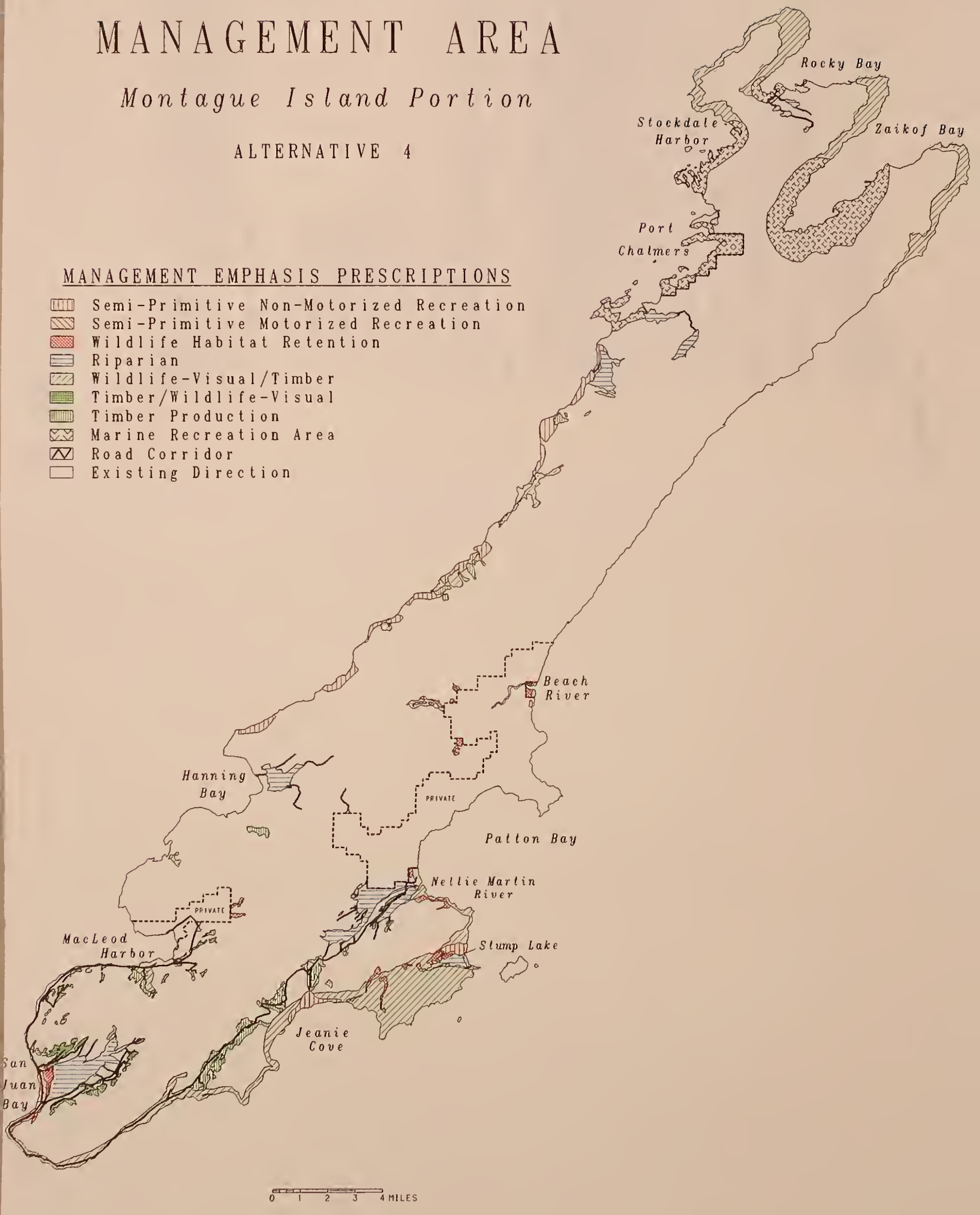
MAP 9

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 4



MANAGEMENT EMPHASIS PRESCRIPTIONS

- Semi-Primitive Non-Motorized Recreation
- Semi-Primitive Motorized Recreation
- Wildlife Habitat Retention
- Riparian
- Wildlife-Visual/Timber
- Timber/Wildlife-Visual
- Timber Production
- Marine Recreation Area
- Road Corridor
- Existing Direction

MAP 10

Alternative 5

Alternative 5 (Maps 11 and 12) proposes high levels of management activities for all resources on south Montague Island, with a significant emphasis on the recreation resource. It was developed to:

1. create a recreation destination on south Montague Island to meet anticipated growth for recreation and tourism in Prince William Sound;

2. provide increased diversification to the local economy through a combination of timber, recreation and fisheries developments;

3. maintain high-value fish and wildlife habitat capabilities;

4. coordinate access to meet national forest and private needs;

5. limit the cumulative effects of timber management in the Nellie Martin River area.

Alternative 5 recognizes the potential of Prince William Sound to meet the growth in recreation and tourism in Southcentral Alaska. Additional recreation developments or services would be directed to either the Forest Service-permitted lodge at MacLeod Harbor or partnerships with private interests to provide visitor facilities at MacLeod Harbor, San Juan Bay and Patton Bay. The Forest Service would cooperate with the private landowner to develop cultural resource interpretative sites. A complete list of the proposed recreation activities and facilities is found in Figure 2-6.

Access

The transportation system (Map 11) continues the emphasis on the south end of Montague Island to accommodate resource development and public use. This consists of:

* 62.3 miles of roads
* 26.25 miles of nonmotorized trails
* 7 miles of motorized trails
* 5 airstrip feasibility studies
* 7 trailhead parking areas
* 1 anchor buoy
* 3 saltwater access points

The road system would connect private land at MacLeod Harbor to private land at Patton Bay across National Forest System land and would consist of 34.5 miles of arterial, 3.9 miles of collector, 15.9 miles of local and 8.0 miles of temporary roads. The arterial road would be constructed under a cost-share agreement between the Forest Service and CAC.

Development of the arterial road could be implemented independent of proposed national forest activity and without Forest Service participation in funding.

A log transfer facility would be located on private land on the north side of MacLeod Harbor and would serve both national forest and private landowner needs.

Nonmotorized trails would be constructed in the MacLeod Harbor, San Juan Bay, Jeanie Cove, Stump Lake, Nellie Martin River areas and along the ridgeline from San Juan Bay to MacLeod Harbor.

A seven-mile motorized trail would be constructed from MacLeod Harbor to connect with the main road in the upper reaches of the Nellie Martin River drainage.

Airstrip feasibility studies would be conducted for sites in San Juan Bay, Jeanie Cove, Patton Bay, Beach River and MacLeod Harbor.

One anchor buoy would be installed in Zaikof Bay.

Trailhead parking areas would be constructed at MacLeod Harbor, San Juan Bay, Jeanie Cove, Nellie Martin River and Stump Lake.

Saltwater access (shown as boat launching facility in maps) would be provided at MacLeod Harbor and San Juan Bay.

Fish and Wildlife

Timber harvest would occur with emphasis on maintaining fish and wildlife habitat capability on the southwest side of Montague Island (subunit 35) and in the Nellie Martin River drainage (subunit 37) (Map 4).

No timber harvest or roading would occur in high-value, low-elevation deer winter range in Jeanie Cove. Harvest in the San Juan River and Nellie Martin River priority #1 Stream Habitat Zones (Map 19) would be limited to areas without substantial braided channel habitat.

Studies would be completed for 14 potential fish habitat improvement sites (Figure 2-1 and Map 11). An estimated 221,700 pounds of fish would be produced annually if all projects were found feasible and were implemented.

Timber

Approximately 1,151 acres of land suitable for timber management within the south Montague Island project area would be harvested during the planning period using the clearcut regeneration system. All stands to be harvested are Sitka spruce or hemlock/Sitka spruce stands and contain an estimated sawtimber volume of 36.0 mmbf.

Of the harvest acreage, 57 percent would be harvested by conventional highlead cable systems. The remaining 43 percent would be harvested by tractor. Harvest unit size ranges from 7 to 98 acres with an average size of 36 acres.

In terms of national forest land suitable for timber management on Montague Island and in the management area, the area that would be harvested during the planning period is 5.3 percent and 1.8 percent respectively.

Recreation

A higher level of recreation facilities and services would be provided through partnerships with the private sector and Forest Service investments.

New recreation opportunities (see Map 11) would include all the facilities proposed in Alternative 4 plus:

a 20-unit campground at MacLeod Harbor;

three recreation cabins in the upper reaches of Nellie Martin River;

recreation cabins at Rocky Bay and Zaikof Bay and

the evaluation of the feasibility of a third recreation cabin on Montague Lagoon.

A complete listing of proposed recreation projects is found in Figures 2-3 A through E.

Based upon the anticipated increase in tourism, overnight facilities and other services at MacLeod Harbor would be expanded. New services would be considered including recreational vehicle rentals (e.g., boats, passenger vehicles, ATVs), food and fuel service and sales, tour boat operations, flightseeing trips, and guided fishing and backpacking trips. Depending on the outcome of a feasibility study, the area used by the local air charter service to land aircraft at MacLeod Harbor could be improved and maintained. All additional developments and services could occur on National Forest System lands, on private land, or a combination of the two.

Visitor use levels on south Montague Island are expected to increase by more than 115 percent as a result of the combined effects of increased tourism in Prince William Sound, the development of a transportation system on the island and the development of additional private and public recreation facilities and services.

Mitigation Measures Specific to Alternative 5

In addition to mitigating measures described under features common to Alternatives 2 through 7, site-specific mitigation measures to be applied to individual harvest units for Alternative 5 (Map 11) are contained in Appendix H.

Mitigation is required to protect the cultural resources at Rocky Bay since additional visitors will be attracted to the area with the addition of the recreation cabin. Such measures could include increased patrols of the area and/or interpretation of the cultural resource and possibly a caretaker at high use times. Specific protective measures would be determined before any pre-construction of the cabin is initiated and after the cultural resource survey has been completed.

Completing the cultural resource survey is rated as being highly effective. Having a caretaker and performing regular patrols would be rated as moderately effective.

Monitoring Specific to Alternative 5

None

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 5



PROPOSED PROJECTS

- Final Harvest - Stand Clearcut
- Precommercial Thin
- Lakes
- Ownership Boundaries
- Roads
- Airstrip Improvement*
- Recreation Trail
- ATV Road or Trail
- Fishery Enhancement Site*
- Family Campground
- Recreation Cabin
- Recreation Cabin*
- Anchor Buoy
- Tent Platform
- Interpretive Site
- Trailhead
- Boat Launching Facility
- Log Transfer Facility

* *Feasibility Study*

MAP 11

CHUGACH NATIONAL FOREST

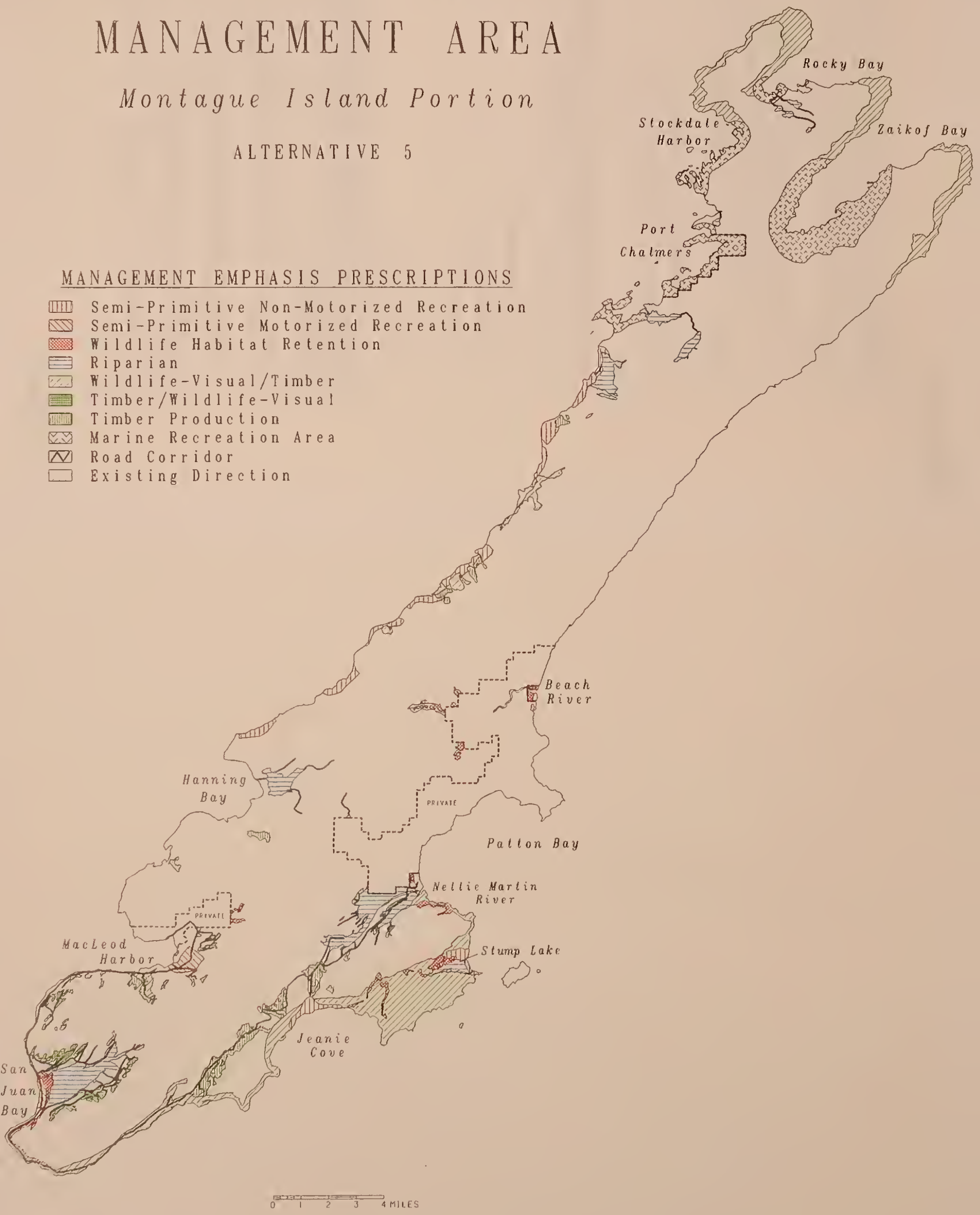
BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 5

MANAGEMENT EMPHASIS PRESCRIPTIONS

- Semi-Primitive Non-Motorized Recreation
- Semi-Primitive Motorized Recreation
- Wildlife Habitat Retention
- Riparian
- Wildlife-Visual/Timber
- Timber/Wildlife-Visual
- Timber Production
- Marine Recreation Area
- Road Corridor
- Existing Direction



MAP 12

Alternative 6

Alternative 6 (Maps 13 and 14) considers development of south Montague Island with high levels of forest management activities for all resources. It was developed to:

1. coordinate access to meet national forest and private needs using CAC's proposed road location;

2. disperse activities to maintain fish and wildlife habitat capability;

3. limit the cumulative effects of timber management in the Nellie Martin River area;

4. produce a volume of timber harvest consistent with other objectives to supply local industry;

5. increase road and trail-related recreation opportunities;

6. enhance commercial and sport fisheries opportunities.

Access

The transportation system (Map 13) continues the emphasis on the south end of Montague Island to accommodate resource development and public use. This consists of:

* 64.3 miles of roads
* 11.75 miles of nonmotorized trails
* 2 airstrip feasibility studies
* 7 trailhead parking areas
* 1 anchor buoy
* 3 saltwater access points

The road system would connect private land at MacLeod Harbor to private land at Patton Bay across National Forest System land and would consist of 34.8 miles of arterial, 5.0 miles of collector, 16.0 miles of local and 8.5 miles of temporary roads. The arterial road would be constructed under a cost-share agreement between the Forest Service and CAC.

Development of the arterial road could be implemented independent of proposed national forest activity and without Forest Service participation in funding.

A log transfer facility would be located on private land on the north side of MacLeod Harbor and would serve both national forest and private landowner needs.

Nonmotorized trails would be constructed in the MacLeod Harbor, San Juan Bay, Jeanie Cove, Stump Lake, and Nellie Martin River areas.

Airstrip feasibility studies would be conducted for sites in Patton Bay and MacLeod Harbor.

One anchor buoy would be installed in Zaikof Bay.

Trailhead parking areas would be constructed at MacLeod Harbor, San Juan Bay, Jeanie Cove, and Stump Lake.

Saltwater access (shown as boat launching facility on maps) would be provided at MacLeod Harbor and San Juan Bay.

Fish and Wildlife

Timber harvest would occur with emphasis on maintaining fish and wildlife habitat capability on the southwest side of Montague Island (subunit 35) and in the Nellie Martin River drainage (subunit 37) (Map 2).

Harvest within the San Juan River and Nellie Martin River priority #1 Stream Habitat Zones (Map 19) would be limited to areas without substantial braided channel habitat.

Studies would be completed for 14 potential fish habitat improvement sites (Figure 2-1 and Map 13). An estimated 221,700 pounds of fish would be produced annually if all projects were found feasible and were implemented.

Timber

Approximately 1,219 acres of land suitable for timber management within the south Montague Island project area would be harvested during the planning period using the clearcut regeneration system. All stands to be harvested are Sitka spruce or hemlock/Sitka spruce stands and contain an estimated sawtimber volume of 36.5 mmbf.

Of the harvest acreage, 71 percent would be harvested by conventional highlead cable systems. The remaining 29 percent would be harvested by tractor. Harvest unit size ranges from 7 to 85 acres with an average size of 36 acres.

In terms of National Forest land suitable for timber management on Montague Island and in the management area, the area that would be harvested during the planning period is 4.7 percent and 1.6 percent respectively.

Recreation

The recreation experience and development proposed are the same as Alternative 4 except that this Alternative (Map 13) includes road access to the cabin at Jeanie Cove and adds an interpretive site in the upper reaches of Nellie Martin River area.

A complete listing of proposed projects is found in Figures 2-3 A through E.

Mitigation Measures Specific to Alternative 6

In addition to mitigating measures described under features common to Alternatives 2 through 7, site-specific mitigation measures to be applied to individual harvest units for Alternative 6 (Map 13) are contained in Appendix H.

Monitoring Specific to Alternative 6

None

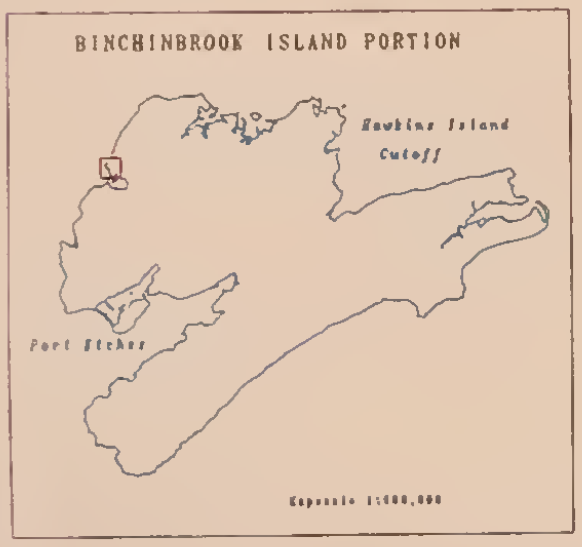
2 Alternatives

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 6



PROPOSED PROJECTS

- Final Harvest - Stand Clearcut
- Precommercial Thin
- Lakes
- Ownership Boundaries
- Roads
- Airstrip Improvement*
- Recreation Trail
- ATV Road or Trail
- Fishery Enhancement Site*
- Family Campground
- Recreation Cabin
- Recreation Cabin*
- Anchor Buoy
- Tent Platform
- Interpretive Site
- Trailhead
- Boat Launching Facility
- Log Transfer Facility

* *Feasibility Study*

MAP 13

CHUGACH NATIONAL FOREST

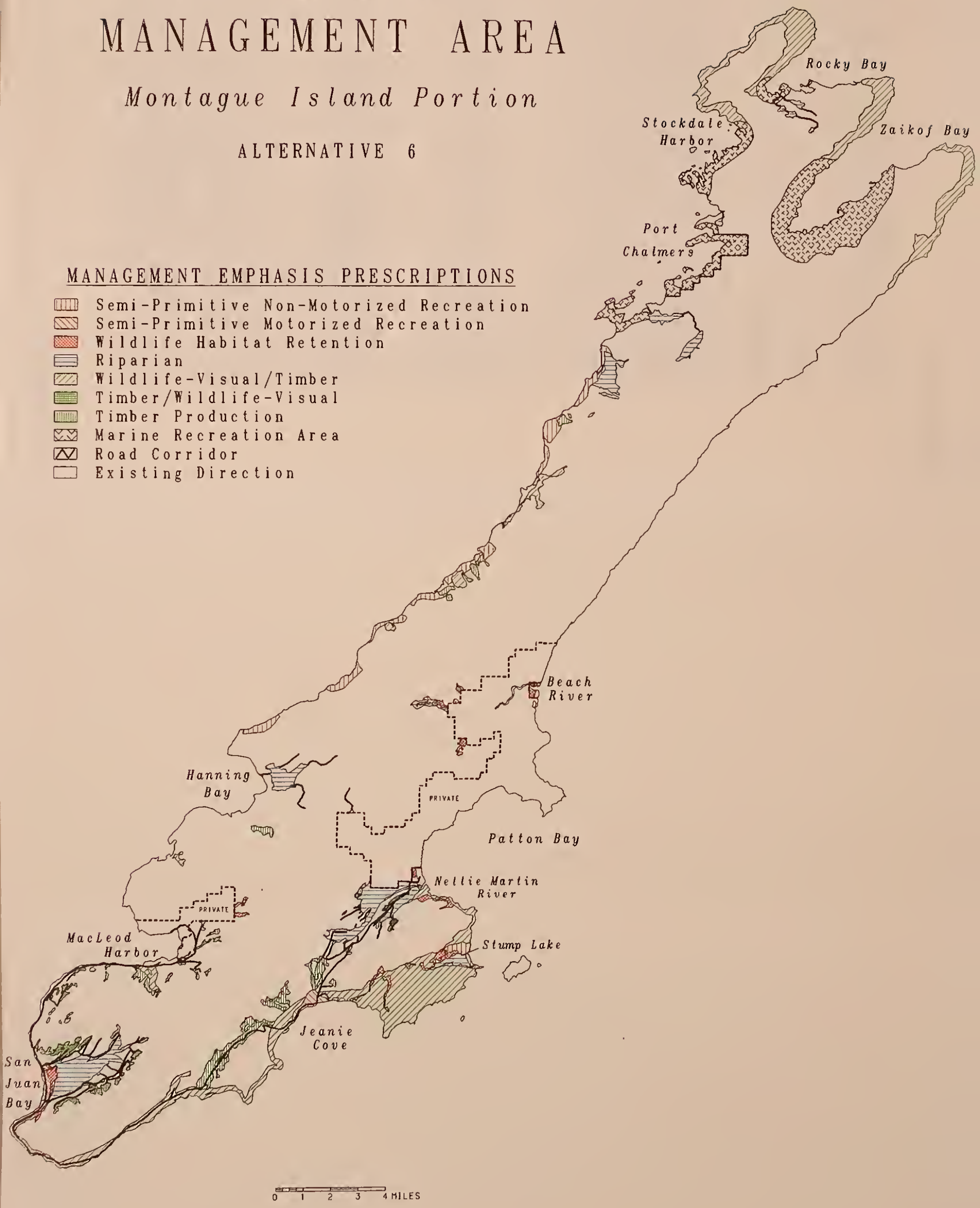
BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 6

MANAGEMENT EMPHASIS PRESCRIPTIONS

- Semi-Primitive Non-Motorized Recreation
- Semi-Primitive Motorized Recreation
- Wildlife Habitat Retention
- Riparian
- Wildlife-Visual/Timber
- Timber/Wildlife-Visual
- Timber Production
- Marine Recreation Area
- Road Corridor
- Existing Direction



MAP 14

Alternative 7 - The Selected Alternative

Alternative 7 (Maps 15 and 16) would restrict development to that necessary to provide access to CAC between its lands at Patton Bay and MacLeod Harbor. This alternative was developed to:

1. provide CAC access to its lands across national forest lands from MacLeod Harbor to Patton Bay;

2. emphasize amended forest plan direction to maintain wildlife habitat and landscape character; and

3. maintain the present recreation experience.

The only activity proposed under this alternative would be the construction of the arterial road previously described in Alternatives 4 and 5. This would be done with a special use permit to CAC. This road would be closed to public use and would be obliterated prior to expiration of the permit in approximately the year 2009.

Forest Service activities would be limited to maintenance activities within the management area. None of the other activities identified in the proposed action or other alternatives would be initiated.

Inventories to update or maintain the present knowledge of forest resources and their uses would continue.

Special Uses

Aside from the special use road, unsolicited requests for new recreation special use permits or requests for expansion of existing recreation special use permits would be evaluated for their consistency with forest plan management area direction with the appropriate NEPA analysis.

Access

The transportation system would consist of approximately 34.5 miles of road to serve only the needs of the private landowner. It would be closed to public use and obliterated prior to the close of the special use permit. Other activities that would occur would be limited to maintenance of existing trails and public easements on Hinchinbrook and Montague islands.

Minerals Management

Operating plans for exploration or development would be considered. Only those lands within the proposed research natural area (Map 3) including the southeast side of Green Island, all of Little Green Island, and The Needle would be considered for withdrawal from all appropriations, including mineral entry.

The Forest Service would ensure that exploration and development of mineral resources would be carried out consistent with the amended forest plan and management area direction. The Forest Service would also require and process all operation plans, leases, permits and reclamation plans before any land-disturbing activities would occur.

Fish and Wildlife

Inventories to collect wildlife and fish habitat data would continue in order to provide updated information for the forest plan revision.

Routine maintenance of two fish passes and two stream channel stabilization projects would continue.

The ongoing experimental chum salmon reintroduction on Montague Island would continue.

Inventories designed to identify potential fisheries enhancement opportunities would continue.

Timber

No timber management activities would occur.

Recreation

No additional recreation development would occur. Routine maintenance of nine cabins would continue. Recreation visitor use would continue at levels largely unaffected by any management activities. The forest would continue to manage the area for the recreation experiences prescribed by the amended forest plan. Inventorying and monitoring of recreation activities would continue to provide current visitor use data for the forest plan revision.

Research Natural Area

As proposed in the forest plan, a research natural area would be recommended for a portion of Green Island, Little Green Island and The Needle as shown on Map 3.

Mitigation Measures Specific to Alternative 7

Forest plan standards and huidelines and appropriate Management Area-wide Standards and Guidelines consistent with the special use road would be implemented for a "maintenance level" of management.

To mitigate the long-term effects of the special use road on the landscape and roadless character of the south Montague Island area, the permit holder would be required to obliterate the road before the expiration of the permit.

The management objective for the road corridor would be to return the area to its natural appearing, roadless state as soon as possible, recognizing that it would take many years before the natural character of the area is fully restored.

Mitigation measures would only apply to the portion of the road on the natioanl forest. Portions of the road (on the national forest) would cross lands that are either unvegetated uplifted beaches, nonforested uplands, unproductive forest uplands, or productive forest uplands. Mitigation measures common to all portions of the road include the removal of all bridgtes, culverts, and other drainage structures and the removal of gravel from the road surface down to mineral soil.

Additional mitigation measures specific to the portions of road that were constructed on the nonvegetated uplifted beach include replacing large rocks and boulders removed during construction.

Additional mitigation measures specific to the portions of the road crossing uplands include the stockpiling of topsoil removed during road construction, replacing the topsoil in the road bed as part of obliteration and the utilization of temporary measures, such as water bars, to control soil erosion until vegetation has been established. In those portions of the road that cross forested upland areas, natural regeneration of alder, Sitka spruce and/or hemlock would be relied on to reforest the road corridor. In those areas where natural regeneration is not anticipated, the road corridor would be scarified and seeded or planted with indigenous species such as willow, alder, or Sitka spruce.

The effectiveness of the above mitigation measures in obliterating the road are estimated to be low (less than 75 percent effective) within the first 50 years following obliteration, moderate (more than 75 percent effective) during 50 to 100 years after obliteration, and high (almost 100 percent effective) after 100 years.

Monitoring Specific to Alternative 7

None

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 7



PROPOSED PROJECTS

- Lakes
- Ownership Boundaries
- Roads

MAP 15

CHUGACH NATIONAL FOREST

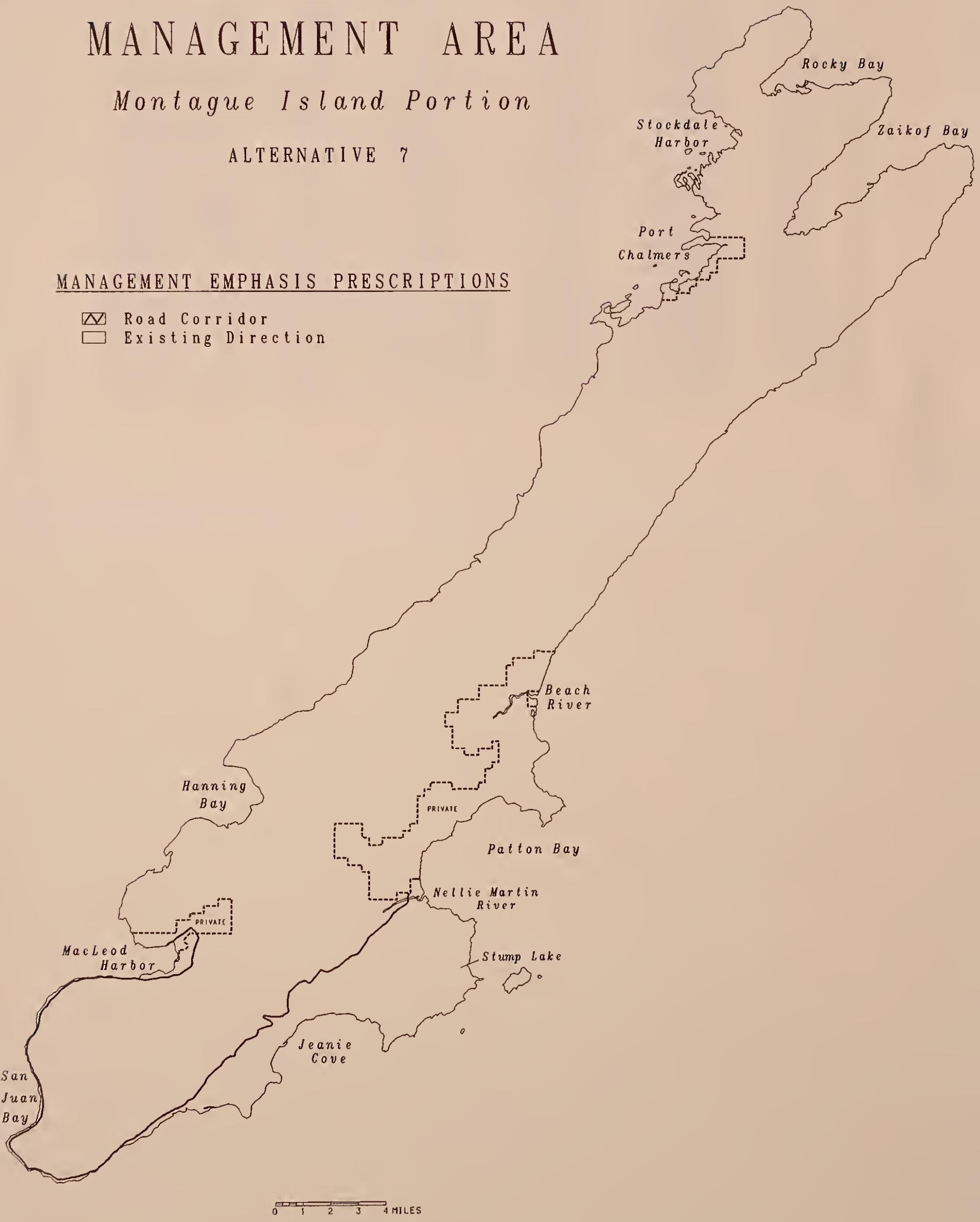
BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 7

MANAGEMENT EMPHASIS PRESCRIPTIONS

- Road Corridor
- Existing Direction



MAP 16

Comparison of the Alternatives Considered in Detail

This section presents comparison of the alternatives by issue and summarizes their differences. Figure 2-6 A and B provides a comparative display of the resource management features of all the alternatives.

Special Use Permits

The Management Area-wide Standards and Guidelines (Appendix F) provide additional direction for the management of activities that require special use permits. These standards and guidelines do not vary among alternatives. Outfitter/guide capacity, as measured in terms of campsites, was evaluated and remains the same for all alternatives. The increased access and facilities proposed in Alternative 5 could result in more recreation special use permits.

Minerals Issue

Under the U.S. Mining Laws, unless they are specifically withdrawn, all national forest lands within the management area are available for mineral exploration and development and oil and gas leasing in all alternatives. The southeast portion of Green Island, Little Green Island and The Needle are the only areas that may be withdrawn if the area becomes a research natural area.

Access Issue

All alternatives, except the no action alternative (Alternative 1), increase access for recreation, timber and fisheries management. Figure 2-6 compares the access provided. Alternatives 4, 5 and 6 also provide for coordinated access management with adjacent private landowners. The proposed arterial road could be constructed independent of Forest Service management activities and could provide indirect opportunities for national forest management activities such as a feasibility study for fish harvest improvements.

The road and trail access in Alternatives 2 through 6 would provide increases in recreation opportunities. These increases would be eight percent or 1,900 visitor days for Alternative 2, 15 percent or 3,600 visitor days for Alternative 3, 25 percent or 6,200 visitor days for Alternative 4, 115 percent or 28,630 visitor days for Alternative 5 and 25 percent or 6,100 visitor days for Alternative 6.

Opportunities for fisheries enhancement on Montague Island would be increased by the proposed roads. As a result of improved access, Alternatives 2 and 3 provide access to four currently inaccessible sites. Alternatives 4, 5 and 6 provide access for 10 sites in addition to the four accessible in Alternatives 2 and 3.

Under Alternatives 2, 3, 4, 5 and 6, the percentage of land suitable for timber management on Montague Island that would have road access ranges from 18 to 31.4 percent. Alternatives 5 and 6 provide the most access to the suitable land base. Alternative 2 provides the least. Alternatives 1 and 7 do not provide any additional access to national forest suitable lands.

Alternatives 2 and 3 would require one log transfer facility to be built on National Forest System land and possibly two additional facilities on private land. Development of the road system in Alternatives 4 through 6 would require only one log transfer facility which would be built on private land at MacLeod Harbor. This would reduce the effects on the marine environment since fewer log transfer facilities would be required.

Fish Habitat Issue

Fish habitat on Hinchinbrook, Hawkins and Green islands would remain unchanged under all alternatives.

All alternatives contain feasibility studies for fish habitat improvements. Four of these studies are currently accessible and contained in all alternatives. Access to additional projects would be made possible by the road system in each alternative. Alternatives 2 and 3 contain an additional four studies and, if implemented, would result in an estimated harvest of 201,400 pounds of fish per year. Alternatives 4, 5 and 6 include 10 additional studies and, if implemented, would result in an estimated harvest of 221,700 pounds of fish per year.

Of the action alternatives, proposed activities on south Montague Island in Alternatives 2 and 4 have the least impacts on the fisheries resource. Alternative 4 disperses timber harvest activities throughout the project area and has the least impact on priority #1 Stream Habitat Zones. Overall impacts to the fisheries resource are almost identical for Alternatives 5 and 6.

Wildlife Habitat Issues

Wildlife habitat on Hinchinbrook, Hawkins and Green islands would remain unchanged under all alternatives.

Deer

Alternatives 2-6 would precommercially thin a total of 1,568 acres of second growth with an emphasis on improving winter range habitat capability.

Alternatives 2 and 3 concentrate timber harvest in Game Management Unit 6, subunit 35 (Map 2). Alternative 4 proposes harvest in subunits 35 and 36, whereas Alternatives 5 and 6 propose harvest in all three subunits.

In subunit 35, deep snow winter habitat capability is reduced by 9, 19, 11, 13 and 13 percent under Alternatives 2, 3, 4, 5 and 6 respectively. In subunit 36, deep snow habitat capability is reduced by approximately 13 percent under Alternatives 4, 5 and 6. Reductions in deep snow winter habitat capability in subunit 37 are only 2 and 4 percent for Alternatives 5 and 6 respectively.

Bear

For the entire Montague Island, Alternatives 1, 2, 3, 4, 6 and 5 respectively would remove 0, 2, 3, 4, 6 and 7 percent (0-415 acres) of the brown bear mature productive forest riparian/beach fringe habitat. For south Montague Island, the alternatives would remove 0, 4, 8, 9, 15 and 16 percent (respectively) of the mature productive riparian/beach fringe habitat.

Bald Eagle

Alternative 5 has the greatest potential for disturbance to nesting eagles from increased human activity, followed by Alternatives 6, 4, 3 and 2 respectively. Under all alternatives eagle nests would be protected with a 330-foot windfirm buffer. However, Alternatives 2 and 3 would have a harvest unit adjacent to one eagle nest buffer zone.

Alternatives 2 and 3 would remove the greatest percentage (nine and seven percent, respectively) of mature productive beach fringe eagle nesting habitat.

Goose

Important goose habitat potentially impacted by the action alternatives consists of mature productive forest land adjacent to muskeg meadows or ponds. Alternatives 1, 2, 3, 4, 6 and 5, respectively, would remove 0, 2, 2, 3, 3 and 4 percent of the goose habitat on Montague Island.

Woodpeckers

Of the action alternatives, Alternatives 2 through 6, respectively, would impact from four to six percent (777 to 1,219 acres) of mature productive forest woodpecker habitat on National Forest lands on Montague Island.

Merganser

From one to eleven percent (54 to 400 acres) of merganser habitat on national forest lands on Montague Island would be harvested under the action alternatives. Alternatives 5 and 6 propose the greatest levels of harvest in riparian areas.

Coordinated Management Issue

Since Alternative 1 does not include developments for access, it does not respond to the concern for improving access coordination. Forest Service management activities would not coincide with private land development within the planning period.

The access system described in Alternatives 2 and 3 would serve only National Forest System resources. National forest management activities would be conducted away from the private lands reducing cumulative effects over what would occur in Alternatives 4, 5 and 6 in the Patton Bay area.

Alternatives 4, 5 and 6 provide for a jointly developed access system. This would allow for coordinated use of the arterial roads and log transfer facilities. These alternatives disperse the harvest throughout south Montague Island.

Alternative 5 identifies opportunities to coordinate recreation facilities and services between the forest and private landowners.

Timber Issue

Figure 2-6 gives a comparison of timber management by alternatives.

Supply

Under Alternative 1, no timber management activities would occur in the Management Area. Alternatives 2-6 concentrate all timber harvest on the southern portion of Montague Island. Total harvest volume, to supply the needs of local industry, varies from 20.9 mmbf in Alternative 2 to 36.5 mmbf in Alternative 6.

Precommercial Thinning

In Alternatives 2 through 6, 1,568 acres of second-growth timber would be precommercially thinned under a wildlife prescription, and 400 acres would be precommercially thinned under a timber production prescription.

Timber Sale Net Value

If the Forest Service constructs the transportation network for timber sale access under Alternatives 2, 3, 4, 5 or 6, the net appraised value of the timber sale would be negative. The timber sale would be a deficit sale regardless of alternative and would require supplemental funds to offset the cost of road and LFT development. This deficit would be the least under Alternative 3, followed by Alternatives 2, 5, 6 and 4.

Because Alternatives 4, 5 and 6 propose an arterial road that will meet both the access needs of the Forest Service for forest management and the access needs of CAC, the Forest Service has the opportunity to cost-share the cnstruction of the arterial road and/or the LTF on CAC land in MacLeod Harbor. When the timber sale for these alternatives is appraised under this assumption, the net appraised value of the timber sale is positive with Alternative 5 having the highest net value, followed by Alternatives 6 and 4. In this case, a Forest Service timber sale under Alternatives 4, 5 or 6 would not be deficit and would not require supplement funds.

Recreation Management Issue

For all action alternatives, primitive conditions are maintained over the entire management area with the exception of the south end of Montague Island. As a result of the varying road access provided under Alternatives 2 through 6, there is a general shift from Primitive to Semi-primitive Motorized and Roaded Natural recreation opportunities. Alternatives 2 and 3 would result in more primitive opportunities while Alternatives 4, 5 and 6 would result in more motorized access. No additional recreation opportunities are provided in Alternatives 1 and 7. Alternative 6 is the only alternative which alters the primitive setting for Jeanie Cove.

Hunting and fishing opportunities would be increased the most in Alternative 5 and are somewhat less in Alternatives 4 and 6. Alternatives 2 and 3 result in fewer opportunities than 4, 5 and 6. Access would remain unchanged in Alternative 1. Alternative 7 would provide foot access in the road corridor direction.

Recreation facilities increase in Alternatives 3, 4, 5 and 6 (see Figure 2-6). Alternative 5 offers the most developed array of facilities and services as a result of opportunities afforded through partnerships. Alternatives 1 and 7 do not propose any new facilities.

Changes in recreation use for the Big Island Management Area range from increases of eight percent over present use levels in Alternative 2 to over 100 percent in Alternative 5. For south Montague Island only, changes in increases in use for Alternatives 2-6 are, respectively, 13 percent, 26 percent, 47 percent, 218 percent and 46 percent. No foreseeable changes in use patterns for Alternatives 1 or 7.

Visual Resource Issue

Implementation of any of the action alternatives results in a decrease in the natural appearance of the landscape and an increase in the altered appearance of the landscape on south Montague Island. The alterations are largely due to timber harvest and road construction in Alternatives 2 through 6; in Alternative 7, the addition of the arterial road would be the primary cause of landscape alterations. Outside of the south end of Montague Island, the remainder of the management area would remain in a relatively unaltered condition. Alternative 1 results in no change in the visual resource as a result of national forest management activities. Cumulative effects of actions on private land result in major modifications of the view shed around Beach River and Patton Bay under all alternatives.

The change in landscape character varies directly with the amount of roading and timber harvest in the action alternatives. Alternatives 2 through 6 result in relatively similar amounts of change in the natural appearance of the landscape; Alternatives 3, 5 and 6 would produce the greatest change and Alternative 2 would cause the least change of that group. Alternative 7 would cause the least change of the action alternatives; Alternative 1 would generate no human-caused landscape change.

The adopted Visual Quality Objectives (VQOs) would not be completely met in any of the action alternatives. Even in Alternative 1 some VQOs are not met due to past actions and existing alterations. Changes in the visual quality would be greatest in MacLeod Harbor under Alternative 2. In San Juan Bay, Alternative 3 would result in the largest amount of landscape modification. The following Figure 2-6 compares the resource management features of the alternatives as they respond to various issues. Outside of Alternative 1, Alternative 7 would come closest to complying with the objectives in those high sensitivity areas.

The landscapes seen from the arterial roads in Alternatives 2 through 7 would be most natural in appearance in Alternative 7. Alternatives 2 through 6 would create roughly similar landscape corridors with mixtures of natural and altered landscapes.

Figures 2-6A and 2-6B Resource Management Features by Alternative

Figure 2-6A Resource Management Feature	Units	Alternatives 1	2	3	4	5	6	7
ACCESS								
Arterial Road	Miles	0	11.6	11.6	34.5	34.5	34.8	34.5
Collector Road	Miles	0	1.9	2.9	2.9	3.9	5.0	0
Local Road	Miles	0	16.8	22.0	13.4	15.9	16.0	0
Temporary Road	Miles	0	8.3	9.5	6.8	8.0	8.5	0
Total Road	Miles	0	38.6	46.0	57.6	62.3	64.3	34.5
Total Road Cost	Million Dollars	0.00	4.65	5.60	6.99	7.56	7.86	0
Road Cost Per Mile	Thousand Dollars	0.00	120.4	122.3	121.4	121.0	122.2	0
Road Cost Per MBF	Dollars	0	222	196	226	216	215	0
Suitable Timber Volume Accessed so. Montague	%	0	18	26.6	24.6	30.9	31.4	0
Nonmotorized Trail	Miles	0	.25	6.0	14.0	26.25	11.75	0
Motorized Trail	Miles	0	0	0	0	7	0	0
Trail Head Parking	Number	0	0	3	6	7	7	0
Salt Water Access	Number	0	0	3	3	3	3	0
Anchor Buoys	Number	0	1	1	1	1	1	0
Log Transfer Facility								
National Forest System	Number	0	1	1	0	0	0	0
Private Lands	Number	2	2	2	1	1	1	1
Air Strips Feasibility Studies	Number	0	0	2	2	5	2	0
FISH (Montague Island)								
Fisheries Enhancement Feasibility	Number	4	8	8	14	14	14	0
Fish Produced per year	Pounds	0	201400	201400	221700	221700	221700	0
Harvest in Priority 1 Stream Habitat Zones	Acres	0	12	139	8	184	196	0
Road in Priority 1 Stream Habitat Zones	Miles	0	1	2	3	5	5	1

Figure 2-6B Resource Management Feature	Units	Alternatives 1	2	3	4	5	6	7
Stream Crossing Priority 1 Stream Habitat Zones	Number	0	11	15	11	16	15	4
WILDLIFE (Montague Island)								
Decline in Deep Snow Year Deer Habitat Capability	%	0	2	3	3	4	4	0
Brown Bear PFL Riparian/ Beach Fringe Habitat Removed	%	0	2	3	4	7	6	0
Eagle Nests within 0.5 miles of road	Number	0	3	3	7	7	7	7
Potential Eagle PFL Nesting/Roosting Habitat Removed	%	0	2	2	1	1	1	0
Goose PFL Habitat Removed	%	0	2	2	3	4	3	0
Woodpecker PFL Habitat Removed	%	0	4	5	5	5	6	0
Merganser PFL Habitat Removed	%	0	1	5	6	11	10	1
TIMBER								
Timber Volume	MMBF	0	20.9	30.9	28.6	36.0	36.5	0
Total Area Harvested	Acres	0	777	1,014	999	1,151	1,219	0
Timber Sale Net Value	Thousand	0	-1,242	-570	527	1,239	971	0
RECREATION								
Increased Recreation Use	RVD	0	1,934	3,646	6,266	28,630	6,108	0
Tent Platforms and Shelters	Number	0	0	1	3	3	3	0
New Cabins	Number	0	2	2	2	8	2	0
VISUALS								
Visual Quality Obj. not met-Montague Is.	Acres	1237	1549	1647	1531	1541	1545	1273
Present Value All Resources	Thousand Dollars	1418	-325	-238	-3	190	295	1595

Chapter 3
Affected Environment

Chapter 3
The Affected Environment

Introduction
The purpose of this chapter is to describe the related resource environments that would be affected by the seven alternative actions in terms that relate to the issues identified in Chapter 1.

Location
The Big Islands Management Area is located in Prince William Sound in Southcentral Alaska (See Map 1).

The Big Islands Management Area is comprised of Hawkins, Hinchinbrook, Green, Little Green, Wooded, Montague islands and The Needle. These extend in a line almost 100 miles long, in a southwest direction from the mainland, across the eastern side of Prince William Sound.

The management area is located in a very active (Zone 4) seismic belt which rings the Pacific Ocean. This zone has the highest potential for earthquakes large enough to do structural damage. Approximately 24 earthquakes of a Richter Scale rating of greater than 5.0 have had their epicenters within 10 miles of the islands in the management area. Approximately 14 of these earthquakes occurred as after-shocks to the earthquake of March 27, 1964. Crustal movement has occurred on Montague and the other islands as a result of these earthquakes. The greatest recorded movement was from the 1964 quake which uplifted the south end of Montague Island 38 feet. The center, mountainous portion of the island also rose significantly compared to the lower elevations on the southeast side of the island.

Lands
Land ownership in the Big Islands Management Area is changing. Current ownership consists of:

Chugach National Forest 314,041 acres (selected lands excluded)

Private 19,447 acres

State of Alaska 1,320 acres.

Alaska Native Corporations have selected an additional 19,313 acres from the national forest. The State of Alaska has selected an additional 7,662 acres from the national forest. Selections by both the State and Native corporations account for an additional 7,714 acres (Figure 3-1).

Special Uses

Special use permits for year round residences have been issued for two sites within the management area. One site is at Mud Bay on Hawkins Island. The other is at Boswell Bay on Hinchinbrook Island. The Boswell Bay site also has a permit for a hangar.

The U.S. Coast Guard has a special use permit for a navigation aid in Boswell Bay and the Federal Aviation Administration has a beacon at Boswell Bay. The Federal Aviation Administration maintains an electronic site at Strawberry Point and a VOR-TAC site at Johnstone Point. There is a U.S. Coast Guard lighthouse at Cape Hinchinbrook.

There is a special use permit issued for a lodge at MacLeod Harbor on Montague Island. Seven outfitter/guide operations have special use permits to use the management area. These are for hunting guide operations on Montague Island.

Existing Electronic/Communications Sites

Hinchinbrook Island

Cape Hinchinbrook	Sect. 8 & 9, T19S, R8W, CRM*
Johnstone Point	Sect. 14 & 15, T16S, R8W,CRM*
Boswell Bay	Sect. 5 & 6, T17S, R5W, CRM*
Forest Service Site	Sect. 12, T17S, R8W, CRM*

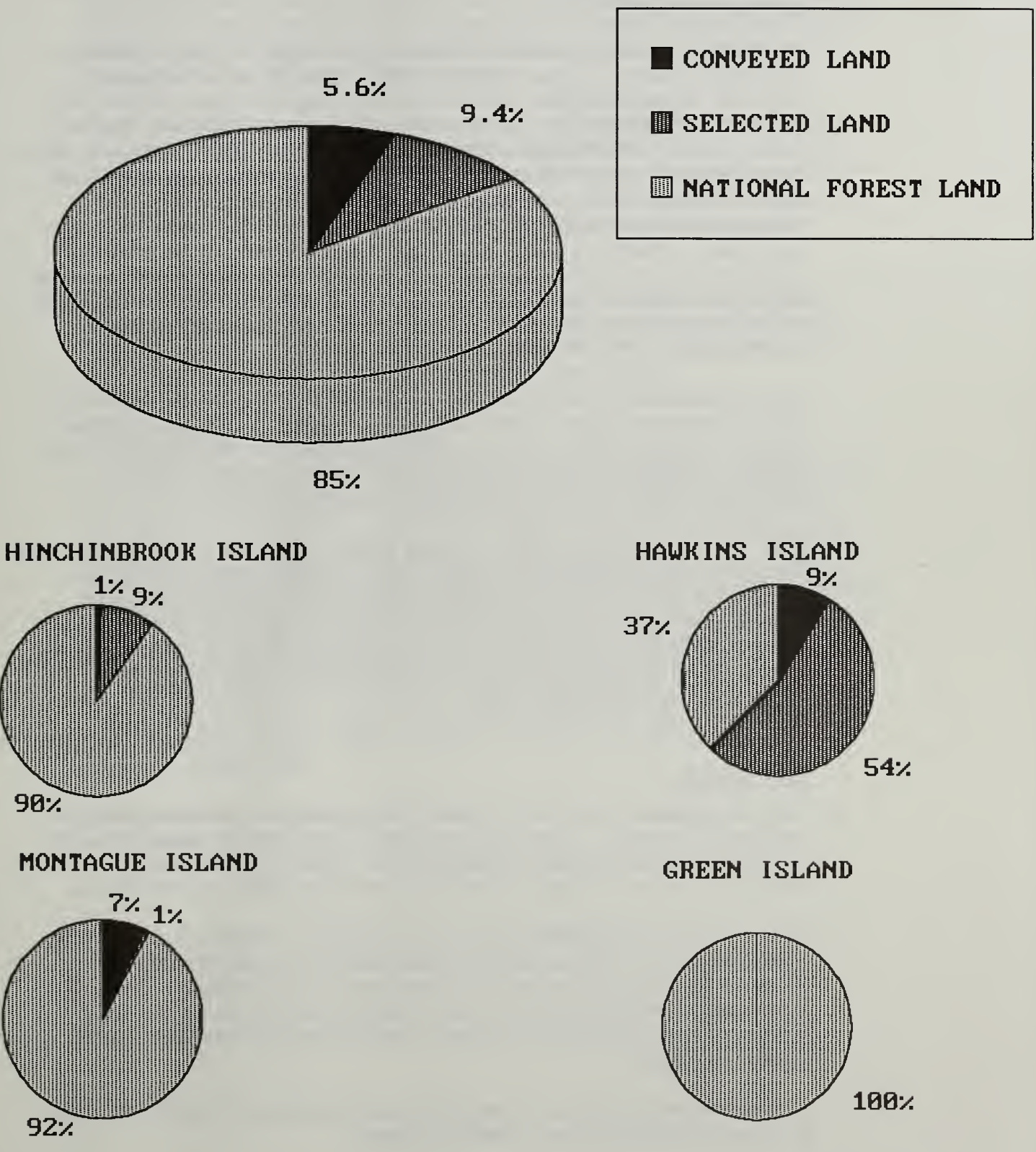
*CRM = Copper River Meridian

Montague Island

Stair Mountain	Sect. 15, T4S, R9E, SM*
Montague Peak	Sect. 21 & 22, T2N, R14E, SM*
Forest Service Site	Sect. 4, T4S, R10E, SM*

*SM = Seward Meridian

Figure 3-1 Landstatus - Big Islands Management Area



Minerals

Lands managed by the Chugach National Forest included in the Big Island Management Area do not have a high potential for leasable, locatable or common variety mineral deposits. The most abundant known mineral deposits include metals such as copper and manganese.

The management area is generally dominated by two major rock groups, the Valdez and the Orca (Nelson, Dumoulin and Miller, 1985). Both groups consist largely of graywacke, siltstone, and shale. The Orca Group generally contains rocks that are less metamorphosed than the Valdez group and also contains mafic volcanic rocks and some beds of conglomerates. Copper in the form of chalcopyrite is the most abundant mineral found in the management area. It is associated with a prominent barite belt and with some mafic volcanic-bearing rocks on the eastern portion of Hinchinbrook Island. Chalcopyrite has also been identified in quartz veins north of Jeanie Cove on Montague Island. Several occurrences of chalcopyrite have been found at the head of Whiskey Cove on Hawkins Island. There are presently six known copper occurrences on Hawkins Island and one on Hinchinbrook Island. There is also one other mineral occurrence on Hinchinbrook Island that may contain cobalt, chromium, nickel or molybdenum.

Gold and silver occur in quartz veins located in shear planes, faults and localized fissures in the metamorphosed sedimentary host rock of the Orca Group (Hoekzema, Fetchner and Kurtak, 1987). All known gold deposits are small and scattered. These deposits are located in a lineal trend that extends along the eastern shore of Hinchinbrook Island into the Heney Mountains and north of Cordova.

There are no known active mining operations in the management area at this time. Exploration and development of the minerals located in this management area is expected to be minimal and small in scale. Increases in the prices for these metals, especially gold and silver, may lead to an increase in activity. Exploration is usually limited because of the harsh climate, the remoteness of the area, and the ruggedness of the terrain. The most likely area for mineral development is located on the southeast side of Hinchinbrook Island.

Access

There are no federal, state or forest roads existing within the boundaries of the Big Island Management Area. There is a low standard 0.5-mile road on private land on the north side of MacLeod Harbor of Montague Island. There are no roads on Hinchinbrook, Hawkins, Wooded, Little Green and Green islands or on the Needle.

Present access to the islands is by boat or small aircraft. There are no public landing facilities for aircraft. However, some wheeled aircraft use undeveloped beaches during low tides and/or ridges clear of obstructions and large vegetation. Stump Lake on Montague Island is the only lake used by float planes. Floatplanes also use a limited number of saltwater coves and bays. Boaters use anchorages and certain beaches for landing.

Four trail and site easements across private land for public use are held by the Forest Service in the Patton Bay area on Montague Island.

There are no existing log transfer facilities in the management area.

Wildlife and Fish

The Big Islands Management Area provides important habitat for a variety of wildlife and fish species. The diverse habitats present are a combination of many interrelated factors which provide species populations with the basic food and cover requirements needed for breeding, nesting, spawning, rearing young, resting, escaping and feeding. Wildlife and fish populations fluctuate with weather conditions and as the habitat becomes more or less favorable for the species.

Vegetation in the Big Islands Management Area, especially mature forests, provides important habitat for brown bears, bald eagles and the largest segment of the Prince William Sound Sitka black-tailed deer population. Numerous other wildlife species including mink, otter, woodpeckers, geese, ducks, shorebirds, song birds and a variety of small mammals rely on specific characteristics of the existing vegetation communities.

The freshwater streams and lakes are important in providing spawning and rearing habitat for pink, chum, coho and sockeye salmon, cutthroat trout and Dolly Varden char. The shallow, near shore marine environments provide spawning areas for herring and rearing areas for juvenile salmon, herring, and shellfish.

Management Indicator Species

The Forest Service manages habitat for all wildlife and fish species on National Forest lands. However, most species can be grouped according to habitat requirements. The Chugach National Forest in cooperation with the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service selected 10 wildlife and fish species occupying the Big Islands Management Area to be classified as Management Indicator Species (Figure 3-2). Management Indicator Species (MIS) are species whose population changes are believed to indicate the effects of land management activities and collectively represent the complexity of habitats, species and associated management concerns. Species were selected that represent the habitats most likely to be affected by management actions with emphasis on those species commonly hunted and fished. (Sidle and Suring, 1986) Monitoring the health and populations of MIS provides estimates of the relative well-being of the groups of animals they represent (Sidle and Suring 1986).

The Montague vole, a threatened or endangered category II candidate species, was also selected as a MIS.

Figure 3-2 Management Indicator Species and Representative Habitat

Species	Habitat
Sitka Black-tailed Deer	Mature Forest
Brown Bear	
Bald Eagle	
Woodpeckers (Piciformes)	Special Habitats
Common Merganser	(Snags, Wetlands,
Canada Goose	Riparian)
Pink Salmon	Fresh Water Aquatic
Cutthroat Trout	and Riparian
Coho Salmon	
Montague Vole	Dry Muskeg and Uplifted Beach

Wildlife

Mature Forest Habitats

Deer are present on all islands in the Big Islands Management Area. Die-offs due to extreme winter snow depths, snow duration and limited winter habitat have periodically reduced deer populations in the management area (Reynolds, 1979). Current population estimates do not exist, but numbers are considered to be high as no major die-offs have occurred in the last 16 years. Mature forests with a well-developed canopy and available understory forage provide essential winter range. Stands in areas with relatively low winter snow depths near the coastline are the most important winter habitats (Map 4), although higher elevation stands on south slopes are also valuable. Approximately 2,700 acres of winter range habitats have been modified through past timber harvest on the inside of Montague Island adjacent to Montague Strait.

Montague and Hinchinbrook islands support the major island populations of brown bear in Prince William Sound. Brown bear are not as common on Hawkins Island. Major concentration areas (ADF&G, 1973) are depicted in Map 4. Upland and beach

fringe forests, along with avalanche chutes and selected alpine habitats, provide for most of the year-round needs of brown bear. The most important habitats are salmon streams and the associated forest cover. Brown bear habitat is generally considered excellent due to spatial arrangement of necessary habitats. The reduction in salmon production as a result of the 1964 earthquake and the associated uplift has changed the availability and species mix of this valuable food source, with unknown effects on brown bear populations.

Bald eagles are common along forested coastal areas throughout the Big Islands Management Area. Mature trees in the beach fringe forests near anadromous fish streams offer the best combinations of food and rearing conditions. Map 4 illustrates the known distribution (other nests undoubtedly exist) of active and inactive eagle nests in the Big Islands Management Area.

Special Habitats

Woodpeckers represent the variety of species that use snags and partially dead trees for foraging and nesting. Mature forest generally provides the necessary snags and other suitable habitat conditions. Although woodpeckers are seldom observed on the management area, snags do not appear to be a limiting factor for woodpeckers or other cavity-nesting birds. Timber stand exam data available from south Montague Island indicates that there are approximately 970 snags averaging 24 inches in diameter per 100 acres in unmanaged forest stands.

Riparian and wetland habitats are critical habitats for numerous wildlife species represented by the common merganser and Canada goose.

Mature forests provide the necessary components for nesting and brood rearing for the common merganser (Wood, 1986; White, 1957). Especially important are snags with cavities for nesting which are adjacent to clear water streams with significant production of juvenile salmonids. Population estimates for common mergansers within the management area are not available.

Prince William Sound Canada geese utilize upland muskeg pond habitats and adjacent mature forests for nesting and brood rearing. Estuaries and bays are important staging and loafing areas. However, little information is available on abundance, distribution or life history. Research currently in progress is directed at determining the genetic characteristics of the Prince William Sound Canada geese.

Habitats Not Represented by Management Indicator Species

The amount of early and secondary forest communities and their associated wildlife species are currently limited in the Big Islands Management Area. Approximately 2,700 acres of timber have been harvested on Montague Island in the last 40 years. Fire, which would create early successional communities, is uncommon. No early succession MIS was determined to be necessary, because these communities would increase with proposed Forest Service and private actions.

Alpine habitats are well dispersed throughout the management area. No vegetation management actions are scheduled and therefore these habitats are not represented by an indicator species.

Hunting and Trapping

Of the approximately 2,000 deer harvested each year in Game Management Unit 6, 45 percent are taken from Montague Island. Hawkins and Hinchinbrook islands account for another 30 percent of the yearly Unit 6 harvest. Figure 3-3 shows the estimated 1987 harvest and days hunted for Unit 6 subunits (Map 4) within the Big Islands Management Area. Approximately 19 percent of the 1987 Unit 6 harvest and 24 percent of the days hunted occurred in subunits 35, 36 and 37 on south Montague Island. Only about 5 percent of the hunters in Unit 6 are non-Alaskans. During the 1987-88 hunting season, an estimated 1,906 hunters spent approximately $1,250,000 to hunt deer in Unit 6 (Griese and Becker, 1988).

Figure 3-3 Estimates for Sitka black-tailed deer harvested and days hunted per subunit in Game Management Unit 6, Alaska, 1987.*

Island	Subunit	Deer Kill	Days Hunted
Montague	33	443	1,019
	34	27	99
	35	129	870
	36	101	260
	37	267	1,118
	38	27	46
Hawkins	43	250	640
	44	210	666
Hinchinbrook	39	122	264
	40	112	119
	41	196	580
	42	129	406
Green	32	34	224
Other Areas		622	3,049
	Total	2669	9,360

** (Griese and Becker, 1988)

Brown bear hunting occurs on Hinchinbrook and Montague islands, where approximately 50 percent of the hunters are non-residents (Culbertson, 1979, Bucaria, 1979). Of the 39 brown bears harvested in ADF&G Game Management Unit 6 in 1985, five were taken from Hinchinbrook and three from Montague (Townsend, 1986). Trapping pressure is light in the management area because of relatively low numbers

of furbearers and limited accessibility. Most trapping of mink and otter occurs during winter months.

Threatened and Endangered Species

No known listed or proposed threatened or endangered species is present on national forest lands within the Big Islands Management Area, although humpback and gray whales are present in adjacent waters.

The U.S. Fish and Wildlife Service has identified the Montague vole as a category 2 candidate threatened or endangered species. This classification lists species for which information suggests that listing as threatened or endangered may be appropriate but for which conclusive data on biological vulnerability are not currently available to support listing. Surveys were initiated in 1987 to document genetic variation, habitat use and distribution. (Steiner and Giezentanner, 1987).

Fish

Fresh Water Aquatic and Riparian Habitats

Pink salmon, coho salmon and cutthroat trout are the MIS representative of the fish species utilizing aquatic habitats within the Big Islands Management Area. The Alaska Department of Fish and Game has designated 142 streams within the management area as anadromous fish streams. These streams, along with streams likely supporting anadromous species, contain approximately 427 miles of stream habitat and 4,462 acres of lakes accessible to anadromous fish. Many streams and lakes which are not accessible to anadromous fish support resident fish populations.

Pink salmon are the most abundant salmon species in Alaska and in the Big Islands Management Area. Their populations are cyclic by nature and vary greatly over time and between even and odd year runs. Critical spawning habitats are provided by the clean and well-sorted gravels within the lower reaches of main stem and principal tributary streams and the upper intertidal zones of major stream channels. Newly emergent pink salmon juveniles migrate immediately to the estuarine environment to begin their rearing and growth.

Coho salmon are generally widely distributed throughout the streams in the management area. Coho spend the first two years of their life cycle as juveniles residing in small streams, lakes, beaver ponds and sloughs. These habitats are closely associated with forested and riparian environments where the type and quality of stream rearing habitats limit natural fish production. Critical habitat features are closely related to the abundance and diversity of stream channels, pools and streamside vegetation. Both the abundance and long-term availability of large organic debris are important factors in maintaining the productivity of coho rearing habitats.

Both anadromous and resident forms of cutthroat trout are present in management area streams and lakes. Habitat requirements for anadromous cutthroat trout are similar to those for coho salmon, although their life cycle is somewhat different.

Resident cutthroat trout are closely dependent on lake environments for feeding and overwintering, while stream habitats are used for spawning and summer rearing. Little

is known regarding the abundance and distribution of cutthroat trout in streams and lakes within the management area.

Fishing

The Forest Service's Big Islands Management Area encompasses the Alaska Department of Fish and Game's Southeastern and Montague fishing districts of the Prince William Sound Fisheries Management Area. The commercial salmon fishery in these districts is primarily for pink salmon with chum salmon being a secondary species. Significant harvests of chum salmon have not occurred in the Montague district since 1973. Coho and sockeye salmon stocks are not managed for commercial harvest but are taken incidental to other fisheries.

Prince William Sound, including the Big Islands Managment Area, is noted for its commercial and sport fisheries for salmon, herring, halibut, bottomfish, crab and shrimp. In 1987, 1,067,000 pink salmon and 35,000 chum salmon were harvested from waters adjacent to the Big Islands Management Area. The total estimated commercial value was $1,281,951, or about 3 percent of the entire Prince William Sound salmon fishery. This figure should be considered a minimium value since some of the catches may have been delivered to tenders in other districts. The commercial catches and the relative proportions of the catch in the different districts also vary from year to year depending on the strength of the runs, the timing of the fishing period openings, and the distribution of fishing effort. Interception of fish bound for other spawning areas is unknown but is assumed to be minimal for this area. Most of the pink and chum salmon caught appear to be wild stocks originating from streams within the management area. Approximately 82-88 percent of the wild stock pink salmon and 97.5 percent of the wild stock chum salmon which are produced within the management area are produced on the national forest.

Streams and lakes in the management area and the adjacent saltwater areas support a substantial recreational fishery. Pink salmon, coho salmon and halibut are the most sought after species in saltwater. Coho salmon, Dolly Varden char and cutthroat trout are the primary freshwater game fish. Several river systems in the planning area are well known for their sport fisheries; the most popular areas include the Nellie Martin River, San Juan Bay, Shelter Bay and Makaka Creek. Other popular sport fisheries areas are associated with Forest Service recreation cabins. The magnitude of the sport fish harvest in the management area and the economic values are unknown.

Fisheries Enhancement

Fish habitat in the management area was significantly impacted by the uplift associated with the 1964 earthquake. Many productive intertidal spawning areas were destroyed and major stream channel destabilization was widespread. These changes reduced habitat capability and caused severe declines in the naturally occurring salmon runs. The reduction in chum salmon populations on Montague Island was primarily related to these impacts.

National forest fish habitat enhancement activities within the area have largely been attempts to mitigate the effects of the 1964 earthquake (Figure 3-4). Numerous stream channel stabilization projects were completed in the late 1960s and early 1970s. Most of these efforts were effective for only a short period because of the extreme channel instability caused by the earthquake. Recent channel stabilization projects have been

more successful, but extreme flow fluctuations and inherent channel instability still limit the project life in most cases.

Three fish passes have been constructed at barrier falls to allow salmon access to the upstream habitat. The Forest Service is also cooperating with the Alaska Department of Fish and Game and the Prince William Sound Aquaculture Corporation to reintroduce chum salmon to Montague Island on an experimental basis.

Figure 3-4 Fisheries Habitat Improvement Projects Completed on National Forest Lands within the Big Islands Management Area.

Stream #	Stream Name	Year	Project Type
17070	MacLeod Cr.	1972	Channelization
17100	Hanning Cr.	1973	Debris Removal
17380	Russell Cr.	1971	Log Removal
17380	Russell Cr.	1972	Log Removal
17440	Wilby Cr.	1967	Log and Gravel Revetment
17440	Wilby Cr.	1968	Rock Barrier Removal
17450	Wild Cr.	1967	Log and Gravel Revetment
17450	Wild Cr.	1968	Channel Stabilization
17490	Shad Cr.	1967	Log Removal & Channelization
17490	Shad Cr.	1968	Log Removal
17590	Rocky Cr.	1983	Steeppass
17700	Udall Cr.	1967	Log Removal
17700	Udall Cr.	1986	Debris Dam Removal
17750	Pautzke Cr.	1967	Channel through Berm
18100	Garden Cove Cr.	1970	Log Removal & Channelization
18110	Etches Cr.	1969	Log Removal
18110	Etches Cr.	1970	Debris Removal
18120	Nuchek Cr.	1969	Channelization
18120	Nuchek Cr.	1970	Channelization and Revetment
18150	Constantine Cr.	1967	Deflector
18150	Constantine Cr.	1968	Deflector and Log Removal
18150	Constantine Cr.	1969	Deflector
18150	Constantine Cr.	1970	Log Removal and Revetment
18150	Constantine Cr.	1971	Channelization
18150	Constantine Cr.	1984	Channel Stabilization
18280	Cook Cr.	1968	Log Removal
18310	Double Cr.	1968	Log Removal
18410	Boswell Cr.	1981	Steeppass
18410	Boswell Cr.	1982	Steeppass Reconstruction
18470	Hawkins Cr.	1967	Channel Stabilization
18470	Hawkins Cr.	1968	Log Removal
18470	Hawkins Cr.	1969	Stream Grading
18470	Hawkins Cr.	1984	Instream Spawning Channel
18500	Canoe Cr.	1969	Stream Widening
18520	Trail Cr.	1980	Steeppass

Vegetation

Existing vegetation for Montague Island is displayed on Map 17. (Green, Hawkins and Hinchinbrook islands are not displayed since no vegetative management activities are proposed for these islands during the planning period.)

The predominant vegetation from the beach to 1,000 feet in elevation consists of muskeg vegetation intermingled with forested stands ranging from 5 to 400 acres in size. In forested stands, commercial tree species include western and mountain hemlock, Sitka spruce and black cottonwood. Understory vegetation consists of shrubs such as blueberry, salmonberry, rusty menziesia and devil's club. The forest floor is composed of a dense mat of mosses and liverworts and plants such as golden thread, laceflower, dwarf dogwood and skunk cabbage. Sitka spruce exists in pure stands on Montague Island. Alder is often found along beaches, streams, snow avalanche slopes and landslides. Alder is a noncommercial species.

Steeper slopes in the 1,000 to 2,500-foot elevation range are generally covered with alder and noncommercial stands of mountain hemlock. Above 2,500 feet, alpine meadows predominate.

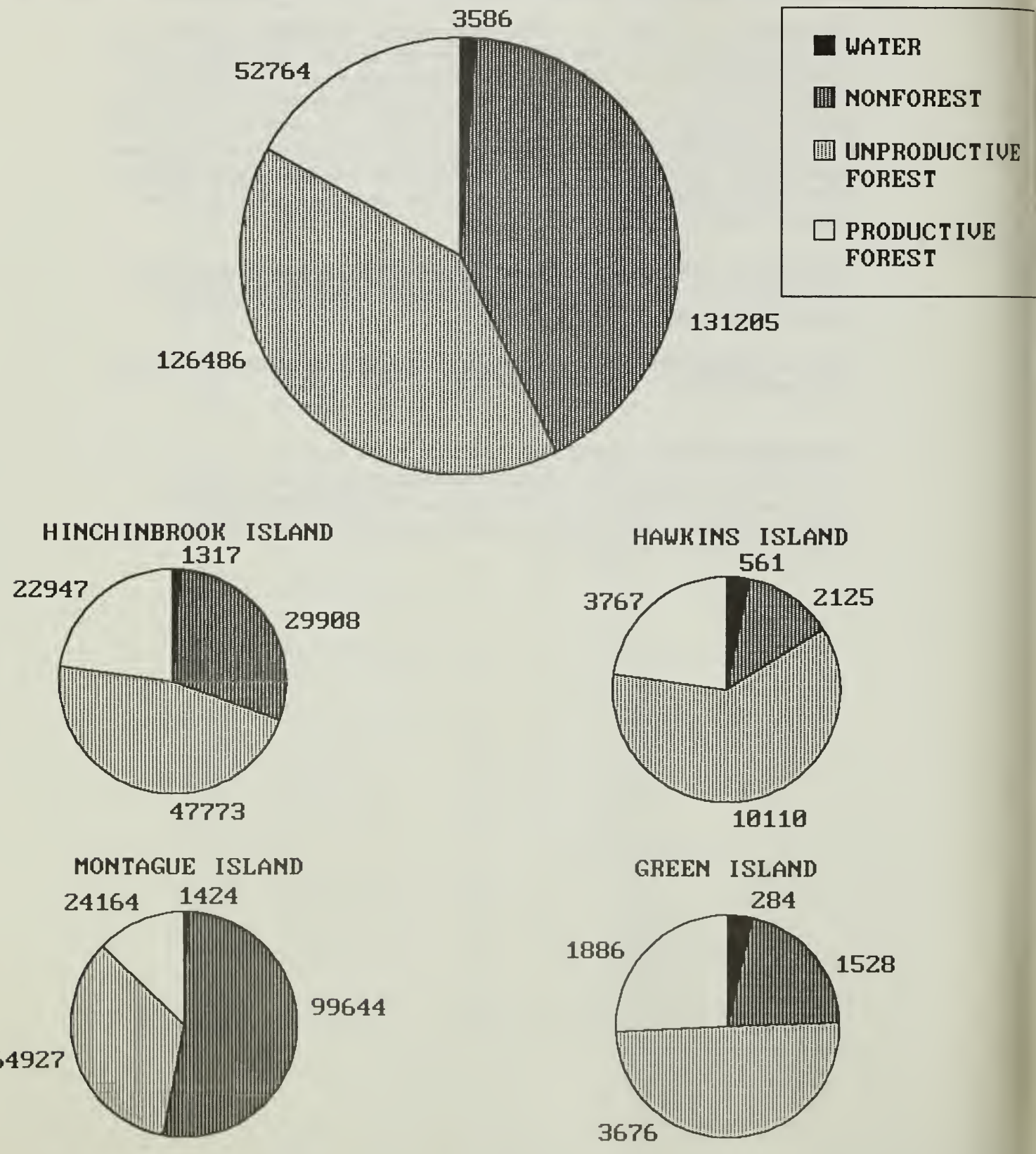
There are no known threatened, endangered or sensitive plants within the Big Islands Management Area.

Productive Forest Land (PFL)

The total land base in the management area consists of 369,497acres of which 314,041 acres (85 percent) is national forest. The remaining 15 percent (55,456 acres) is or will be in private or State ownership assuming all currently selected lands are eventually conveyed (Figure 3-1).

Figure 3-5 displays the Management Area acreage by land class that is visually displayed on Map 17. In the management area, approximately 17 percent (52,764 acres) of national forest land is classified as productive forest land.

Figure 3-5 Land Class by Acres of National Forest Land in the Big Islands Management Area



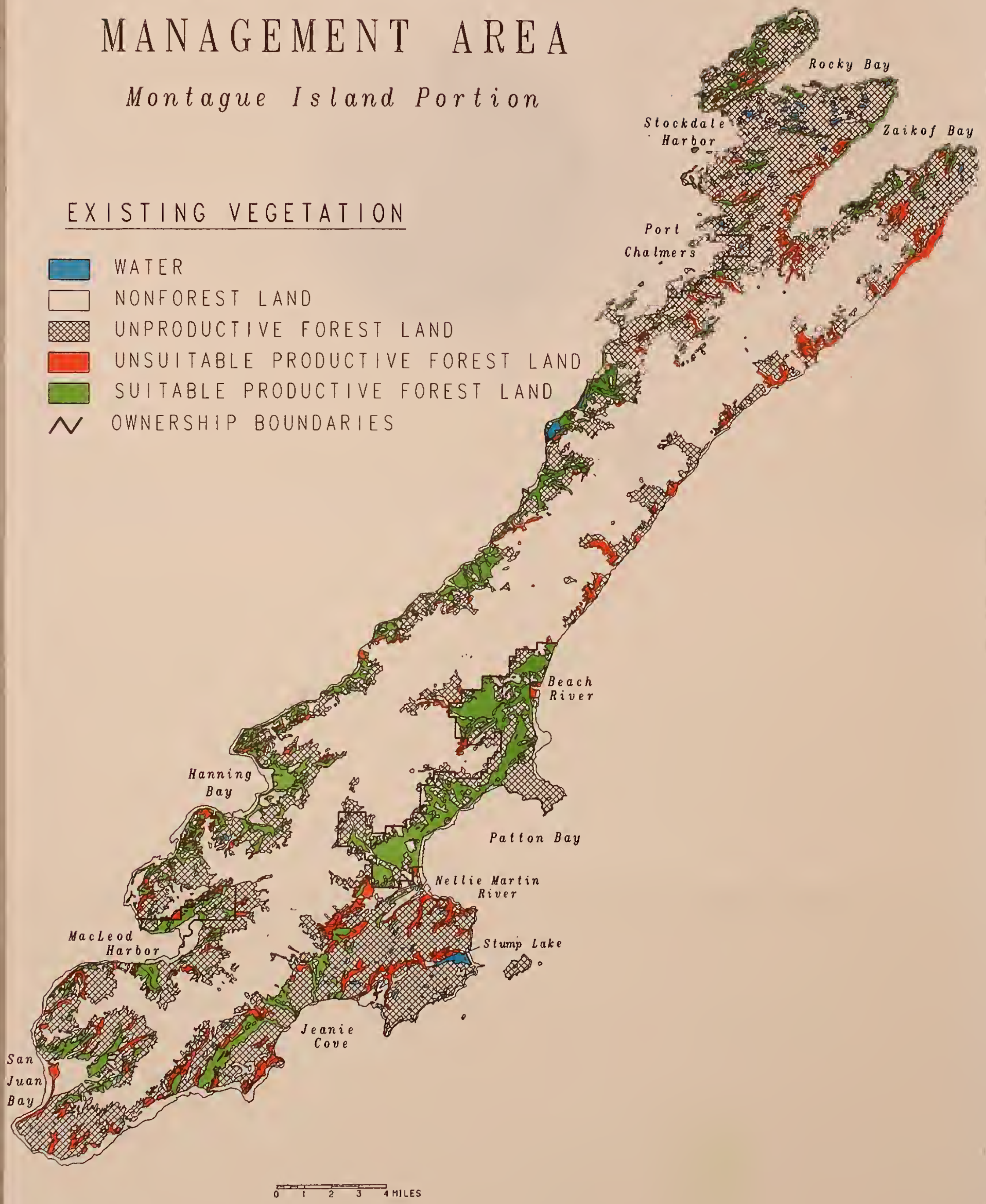
CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

EXISTING VEGETATION

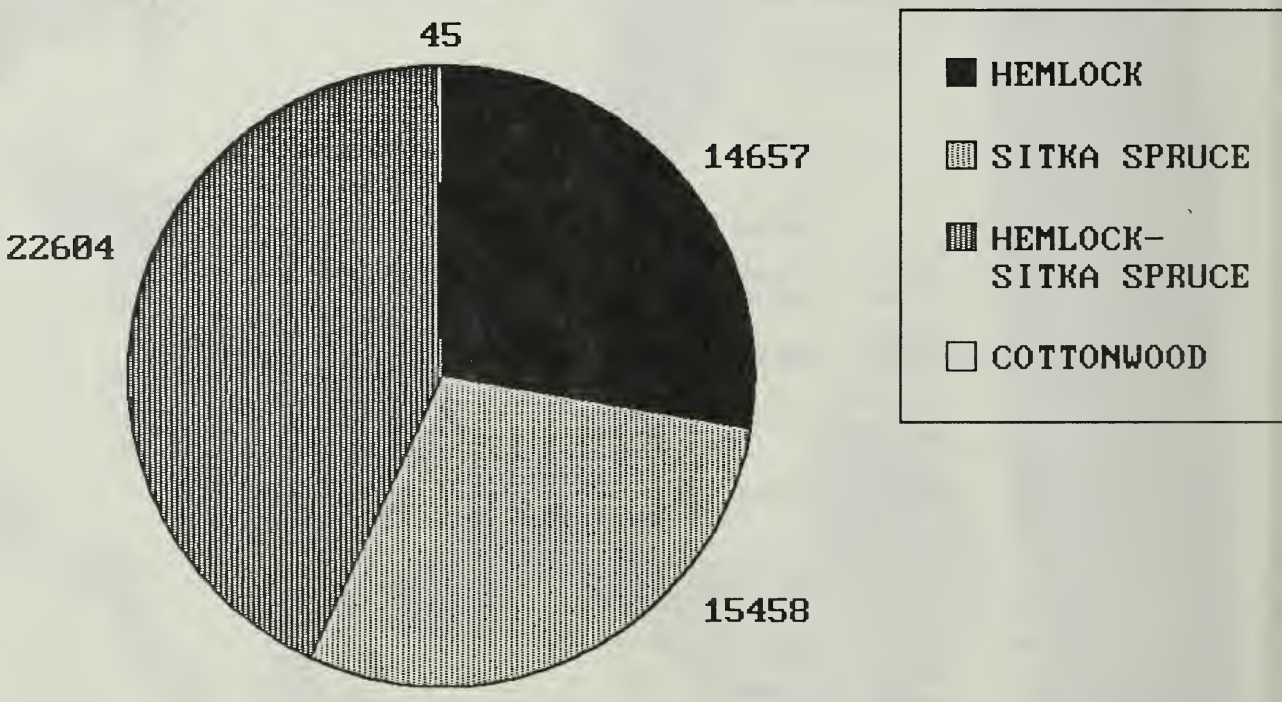
- WATER
- NONFOREST LAND
- UNPRODUCTIVE FOREST LAND
- UNSUITABLE PRODUCTIVE FOREST LAND
- SUITABLE PRODUCTIVE FOREST LAND
- OWNERSHIP BOUNDARIES



MAP 17

As displayed in Figure 3-6, national forest productive forest land consists of hemlock/Sitka spruce (43 percent), Sitka spruce (29 percent), and hemlock (28 percent) stands containing approximately 1,083 mmbf of sawtimber.

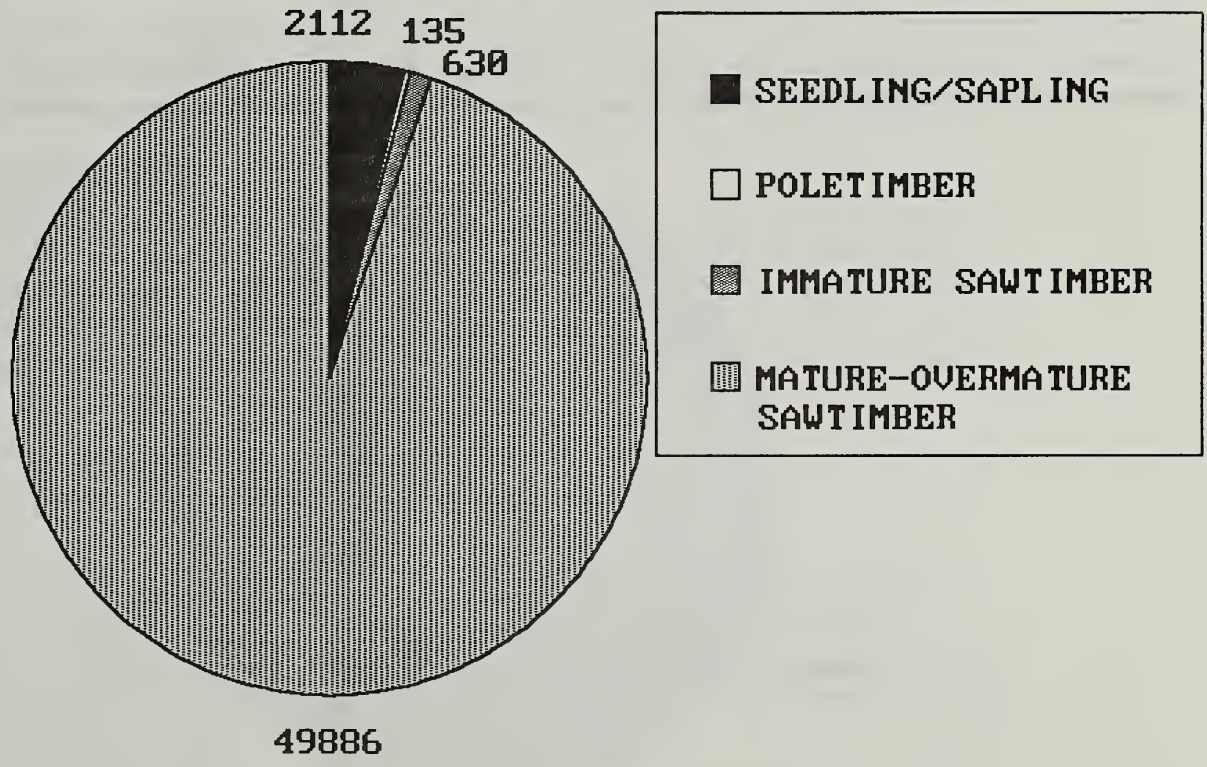
Figure 3-6 Forest Type - Acres of Total Productive Forest Land (PFL)



As displayed in Figure 3-7, 95 percent of National Forest productive forest stands in the management area are classified as mature to over-mature. These stands are generally well past the age of maturity as evidenced by declining growth rates and signs of over maturity such as dead and dying trees, snags, and down woody material. They are usually characterized by large diameter trees, multi-layered canopies, a range of tree diameter sizes, and the presence of understory vegetation. Net stand volumes average 21,000 board feet per acre and range from 8,000 to 40,000 board feet per acre.

The remaining five percent of productive forest land supports even-aged stands of second growth hemlock/Sitka spruce which resulted from previous timber harvests dating back to 1947 or occurred as a result of the 1964 earthquake uplifting. All these stands regenerated naturally and contain trees of nearly uniform age and size with few dead and dying trees and less dead and down woody material than in mature stands.

Figure 3-7 Size Class - Acres of Total Productive Forest Land (PFL)

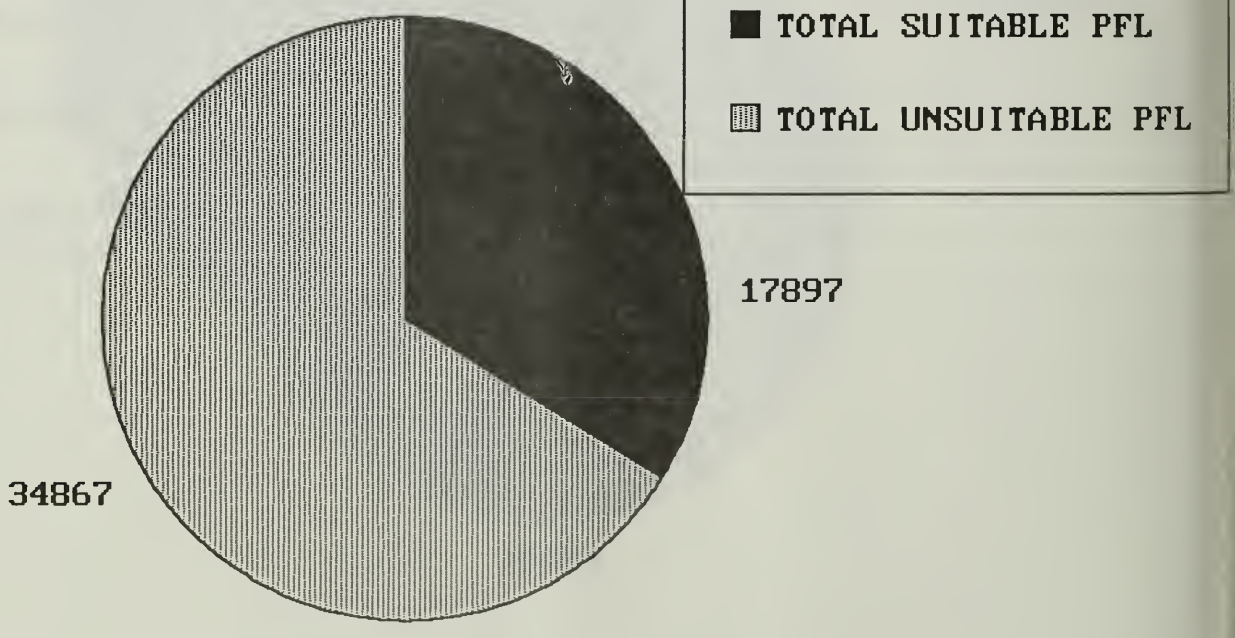


Forest Land Suitable for Timber Production (SFL)

For the purpose of long-term effects analysis and comparison to the amended Forest Plan, all productive forest land in the management area was further classified for suitability for timber production. With the application of site-specific management prescriptions (Appendix G) to all proposed project locations, timber stand suitability was fine-tuned by locating stream protection buffers, stands for wildlife retention, and stands with visual concerns. Outside of proposed project areas, timber stand suitability is less precise without the application of site-specific management prescriptions and will be subject to modification at the time of Forest Plan revision.

Figure 3-8 displays the suitable land for the management area on National Forest land for the planning period. Of 52,764 acres of productive forest land, 66 percent (34,867 acres) is classified as unsuitable for timber production. Thirty-four percent (17,897 acres) is classified as suitable for timber production. Compared to a suitable land base of 19,238 acres in the amended Forest Plan, this is a seven percent reduction (1,341 acres) in the management area's suitable land base. This reduction is primarily due to the primitive ROS designation on Hinchinbrook Island for the planning period and using updated inventory information.

Figure 3-8 Suitability Class - Acres of Total Productive Forest Land (PFL)



For the management area, the National Forest suitable land base (17,897 acres) currently contains an estimated net sawtimber volume of 395.4 million board feet (mmbf). Of the total suitable acreage, seventy-eight percent is located on Montague Island, seventeen percent on Hawkins Island, and five percent on Green Island. Figure 3-9 displays the estimated net sawtimber volume on suitable land by forest type and island.

Figure 3-9 Net Sawtimber Volume in Millions of Board Feet (mmbf) on National Forest Suitable Land by Forest Type and Island

Forest Type	Hinchin-Brook	Hawkins	Green	Montague	Total NF SFL MMBF	Per cent of Total mmbf on NF SFL
Hemlock	0	37.2	0	25.2	62.4	16%
Sitka Spruce	0	1.1	2.4	215.7	219.2	55%
Hemlock / Sitka Spruce	0	15.7	17.1	80.9	113.7	29%
Cottonwood	0	0	0	0.1	0.1	- %
Total	0	54.0	19.5	321.9	395.4	100%

Recreation

The Big Islands area of Prince William Sound is generally undeveloped and supports a variety of recreation activities. Fish and wildlife resources attract both consumptive and nonconsumptive resource users. Solitude and scenery are also major attractions. Recreational boating is a major use of the Sound and includes power boating, sailing and sea kayaking. Other recreation activities include: sightseeing, cabin use, beachcombing, clamming, and nature study.

The commercial fishing fleet also makes use of the management area before and after fishing seasons. They use it as an anchorage and they hunt in it.

Recreation use of the management area was estimated at 25,000 recreation visitor days (RVDs) in 1986 including 5,800 visits in developed sites (recreation cabins) and 19,200 other types of visits. This compares with an estimated 14,800 visitor days shown in the 1984 Forest Plan (based on 1981 RIM data). This 59 percent increase in visitor days is due to both actual increases in use and improvements in the data collection process.

The management area offers recreation opportunities from developed to very primitive. The vast majority of the area is provides for primitive and semi-primitive recreation opportunities. Most of the national forest land in the management area is inventoried as primitive to semi-primitive. The Patton Bay area on Montague receives more use and is inventoried semi-primitive motorized. The developed area around the lodges at MacLeod Harbor and Constantine Harbor are inventoried as rural. Several timber sale

areas on the inside beach of Montague Island are inventoried as roaded modified. Figure 3-10 shows acreage for each Recreation Opportunity Spectrum class.

Figure 3-10 Acreage in the Big Islands Management Area by ROS class

Pristine (Formerly P I)	194,129
Primitive (Formerly P II)	32,968
Semi-Primitive Non-Motorized	90,430
Semi-Primitive Motorized	21,752
Roaded Modified	9,748
Roaded Natural	529
Rural	529

There are nine public recreation cabins in the Big Islands Management Area, with a total capacity of 53 people at one time. All of the current Forest Service cabins receive moderate to heavy use relative to other cabins on the forest. During the past three years, several south Montague Island cabins had more requests for reservations than there were nights available.

Currently there are no Forest Service anchor buoys or tent platforms in the management area. The forest plan provides for the evaluation of three anchor buoys and/or tent platforms in the management area.

The forest plan provides for the evaluation of at least four marine recreation system units in the management area. The intent of these areas is to maintain recreation settings that are capable of providing a variety of recreation opportunities. Facilities could be provided but the emphasis would be on maintaining natural appearing recreation settings.

There are currently no limits on the number of special use permits or types of operations for the management area. In 1986, seven outfitter/guides were operating under Forest Service permits. They provided services that included guided hunting and fishing, and drop-off service with a temporary camp. There was only one permit for a temporary camp which was located at Shelter Bay.

There are also a number of private sector recreation operations that do not require a permit from the Forest Service at this time, but depend heavily on the management area for economic stability. A 1987 sampling of 10 air taxi and charter boat operators reported taking approximately 2,000 passengers to the management area. Deer hunting on Montague Island was the most frequently mentioned activity with the highest number of passengers (875 of the 2,000).

The MacLeod Harbor Lodge is the only concessionaire operation in the management area, although interest has been expressed in developing lodges or float lodges at other locations.

Forest off-road vehicle (ORV) zoning was implemented in 1975 to meet the needs and diverse interests of motorized and non-motorized recreation visitors. The entire Prince William Sound area was left open to motorized use during this planning process. While forest vegetation, terrain and lack of access all tend to limit use of ORVs, limited use is taking place.

Currently there is no length-of-stay restriction for this management area except for use of the recreation cabins. Some long-term camping does occur, which can preclude other recreation uses or result in adverse resource impacts.

Visual Resources

The Big Islands Management Area is composed of a diverse range of scenic landscapes. These landscapes generally have a natural appearance with few human-caused alterations. The current status of these landscapes will be described according to the various parameters defined by the USDA-Forest Service Visual Management System. This system is described in detail in a series of Agricultural Handbooks entitled National Forest Landscape Management and in the Forest Service Manual 2300, chapter 80.

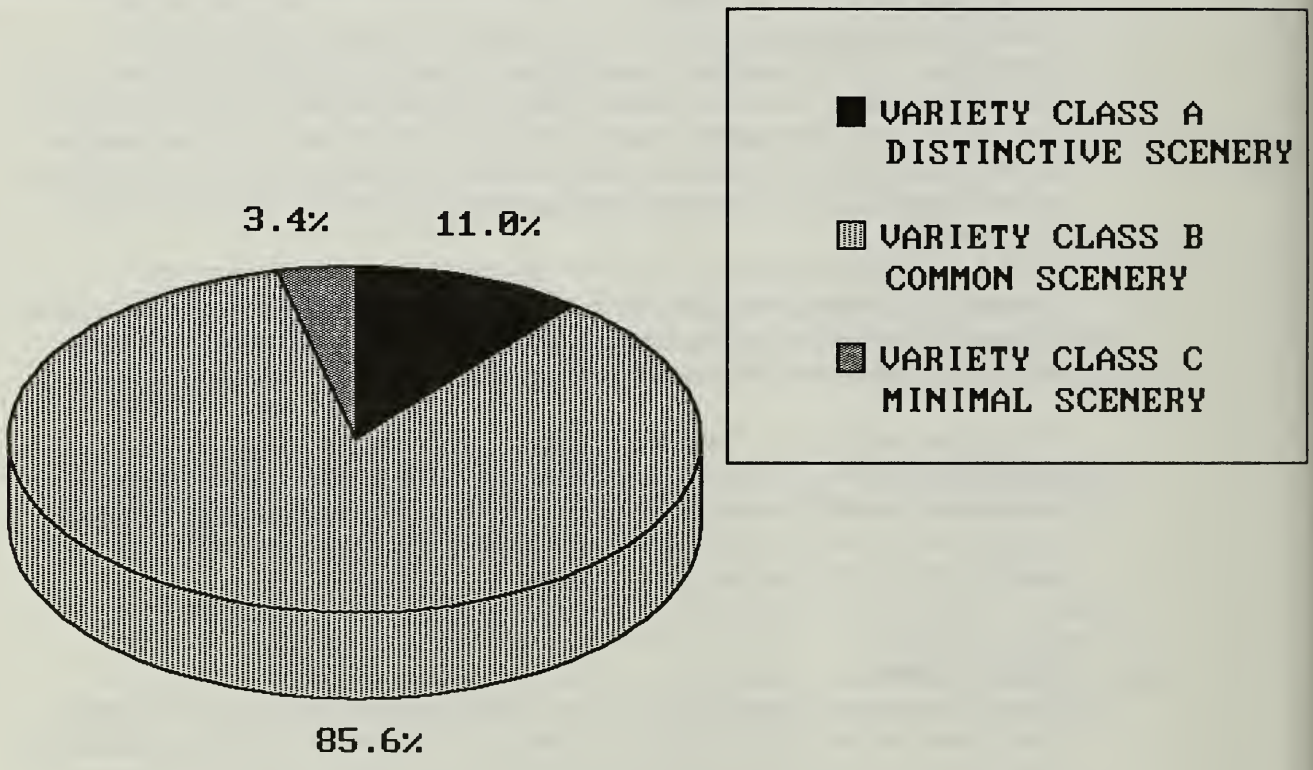
Two primary inventories measure the existing situation and provide baselines against which the effects of each alternative can be evaluated. Those baselines are the adopted visual quality objectives (VQO's) and the existing visual condition (EVC).

The process described in Volume 2, Chapter 1 of the National Forest Landscape Management series was used to inventory the visual objectives. That inventory is documented in a 1979 report entitled Visual Resource Inventory, Chugach National Forest. The process combines three parameters; variety class, sensitivity level and distance zone, in the synthesis of the inventoried visual objectives.

Variety Class

Three variety classes measure the level of inherent scenic quality in the landscape. Those levels would not be changed by proposed management activities. The distribution of lands by variety class is shown in Figure 3-11. Variety class A landscapes have the most diversity and greatest potential for high scenic value.

Figure 3-11 Variety Class - Big Islands Management Area



The management area is characterized by irregular coastlines, steep U-shaped valleys, glaciers and other evidence of current and past glaciation. Saltwater is a strong unifying factor, both as a means of access and as a foreground feature in characteristic views of the area. Snowy, glaciated alpine backdrops are also typical of Prince William Sound views. Vegetation between the water and the ridges exhibits diversity in patterns, textures and species.

On the management area, coastlines vary from sandy beaches, such as the one at Patton Bay, to steep, rocky cliffs common to much of the Gulf of Alaska side of Montague Island. While the ridgelines down the center of both Montague and Hinchinbrook Islands have examples of the glaciated and snow-covered terrain common to the northern mainland of the sound, large, relatively flat areas are more prevalent in the management area than in the mainland. The muskeg and tundra pond complexes at the north end of Montague Island and over much of Green Island add to the islands' diversity and differentiate them from much of the rest of the sound. Broad and relatively lengthy valleys like the Nellie Martin drainage also serve to distinguish the islands from the remainder of the Sound.

The most scenic (variety class A) landscapes tend to be the high alpine ridges and glaciers, the more varied and undulating coastal areas and, to a lesser degree, steep U-shaped valleys.

Sensitivity Levels and Distance Zones

The other two criteria that go into the formulation of the VQO inventory are sensitivity levels and distance zones. Three sensitivity levels are inventoried for the management area:

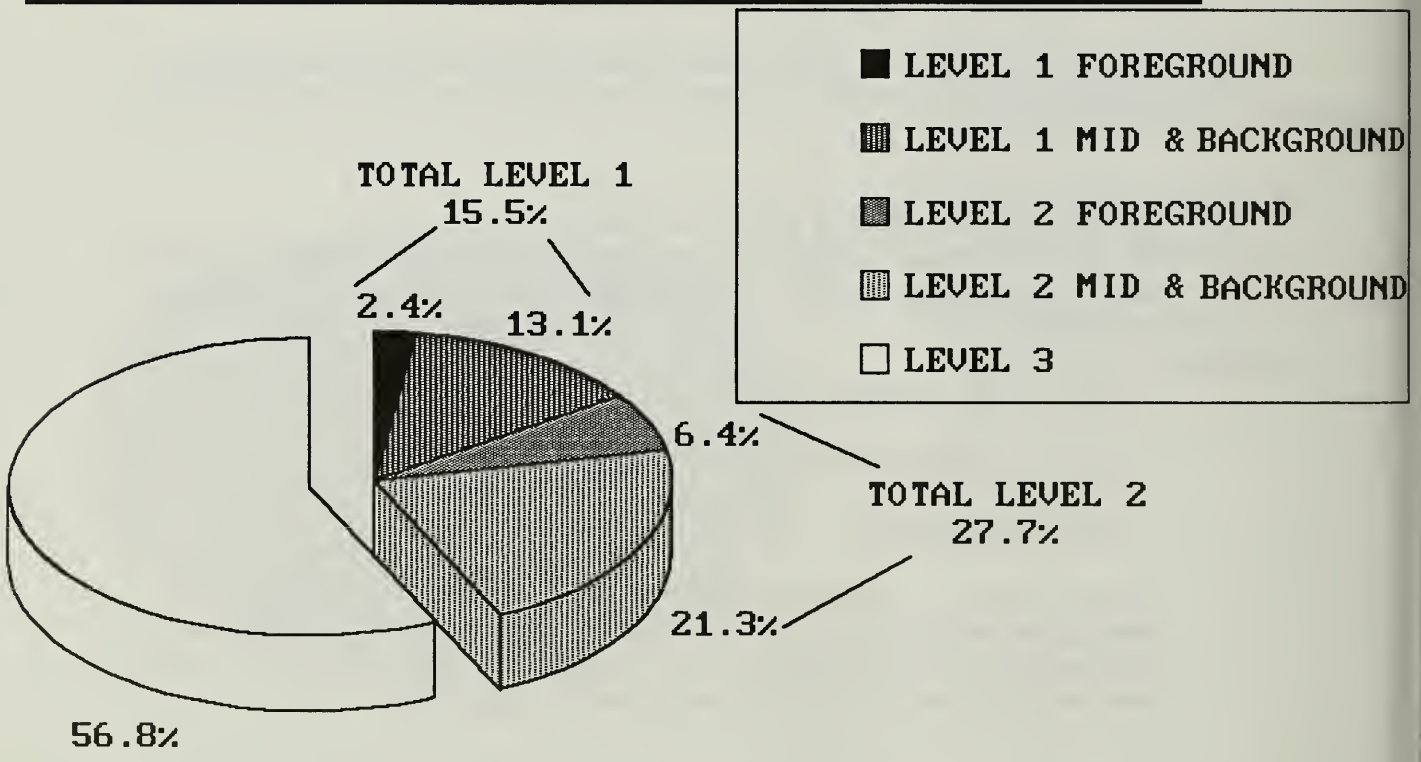
Level 1: high sensitivity

Level 2: medium sensitivity

Level 3: low sensitivity

Distance zones are divided into foreground, middleground and background. Sensitivity levels and distance zone criteria combine to give an indication of the overall social significance of forest landscapes. The distribution of lands among the sensitivity levels and distance zone combinations is shown in Figure 3-12.

Figure 3-12 Sensitivity Levels and Distance Zones - Big Islands Management Area



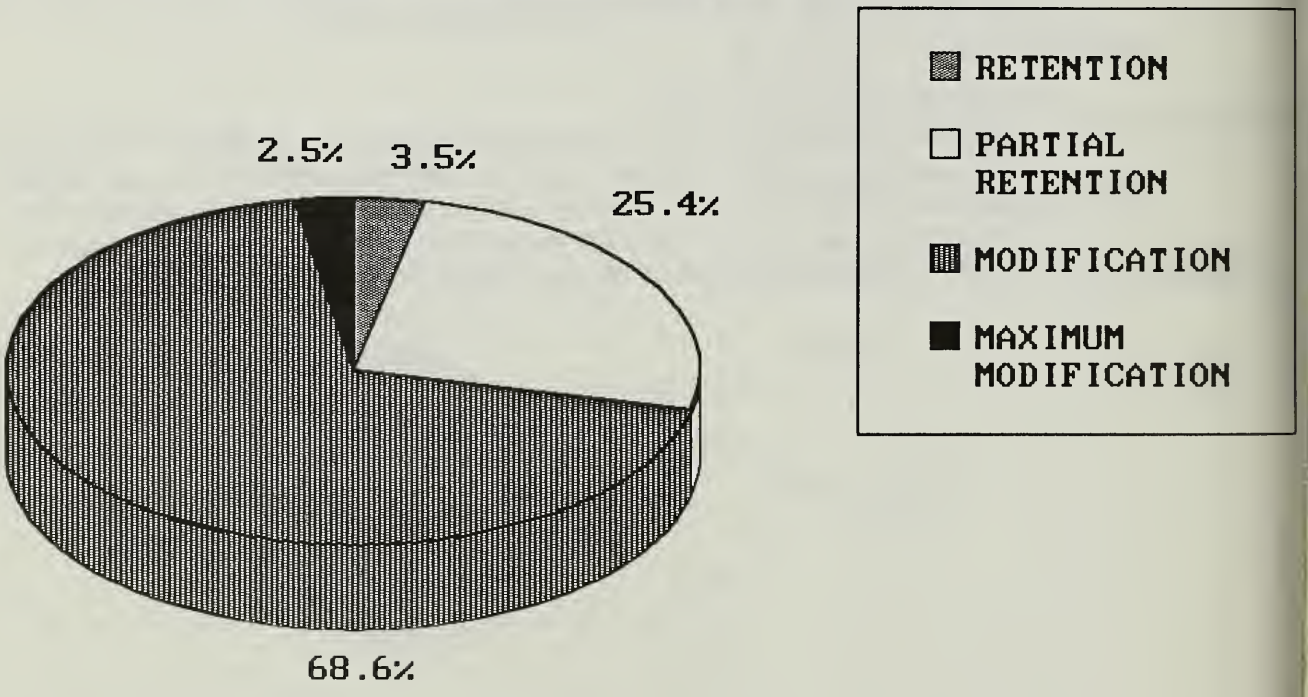
Given their saltwater surroundings, access to and initial views of the islands are from boats or small planes. Most use on the islands tends to focus on Forest Service recreation cabins. Thus landscapes seen from the cabins are highly sensitive. Small boat anchorages not associated with cabins, e.g. Port Chalmers, Rocky Bay and Zaikof Bay, are also landscapes that are commonly viewed and are therefore moderately sensitive. Sportfishing areas like the Nellie Martin River and Shelter Bay are also often seen by the recreating public. The central coast of Montague Island, from MacLeod Harbor to north of Hanning Bay, is a sensitivity level 1 middleground based on high sensitivity viewpoints across Montague Strait. Currently, no visually sensitive roads and few trails are present in the area. None of the area is subject to the intense level of visitation and visual scrutiny associated with the heavily-used transportation corridors or developed recreation sites located on the Kenai Peninsula portion of the forest.

The highest use travel corridor associated with the management area, the Alaska Marine Highway route, skirts the periphery of the islands and only gives travelers distant views of the islands. These views reveal little detail of the islands landscapes and would be essentially unaffected by any management activities.

Visual Quality Objectives

Variety class, sensitivity level and distance zone criteria were combined to produce the inventoried visual quality objectives (VQO's). These inventoried VQO's were adopted as standards by the forest plan. They define the degree of landscape alteration that is permissible in views from the sensitive viewpoints. Montague Island is allocated to four of five possible objectives as shown in Figure 3-13 and Map 18.

Figure 3-13 Visual Quality Objective - Big Islands Management Area



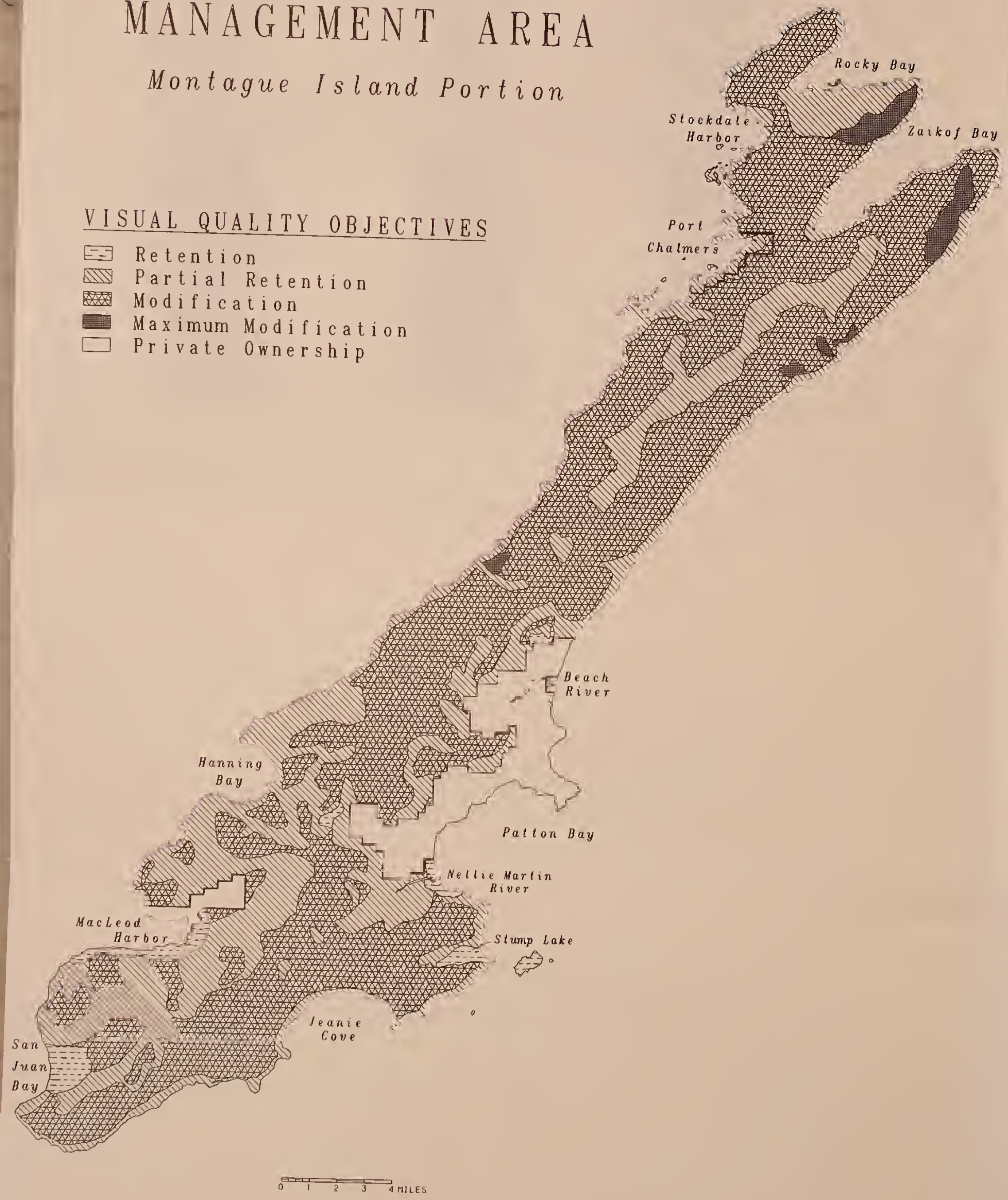
CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

VISUAL QUALITY OBJECTIVES

- Retention
- Partial Retention
- Modification
- Maximum Modification
- Private Ownership



MAP 18

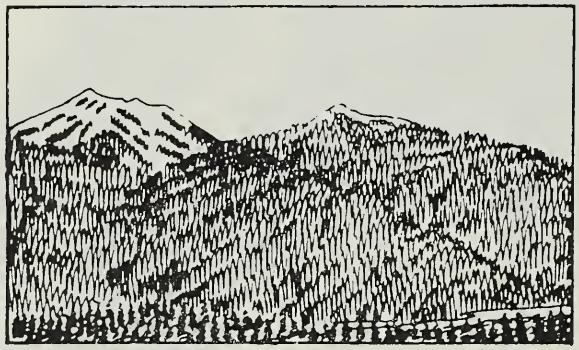
Figure 3 - 14

Visual Condition (VC) - Visual Quality Objective (VQO)

VQO Preservation

VC I Untouched

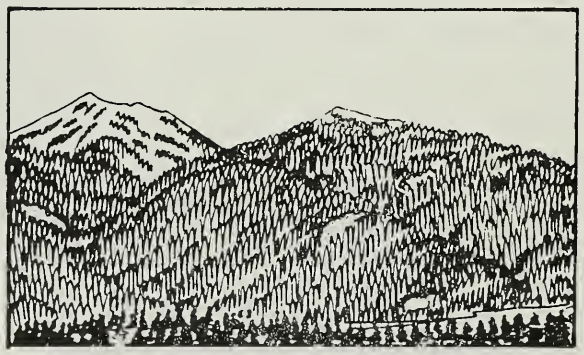
Predominately ecological changes



VQO Retention

VC II Unnoticed

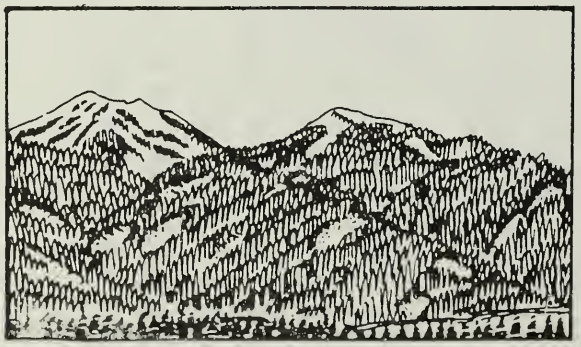
Changes are not evident.



VQO Partial Retention

VC II Minor Disturbances

Changes are noticed, but do not attract attention.

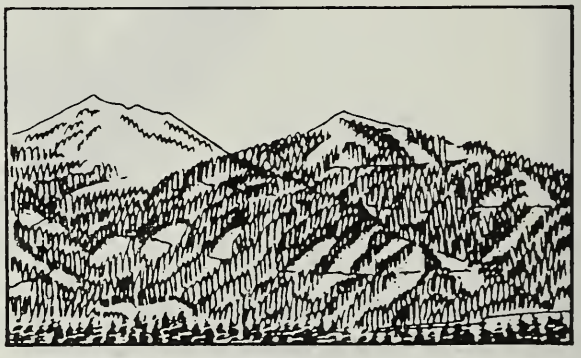


NATURAL CHARACTER DOMINATES

VQO Modification

VC IV Disturbance

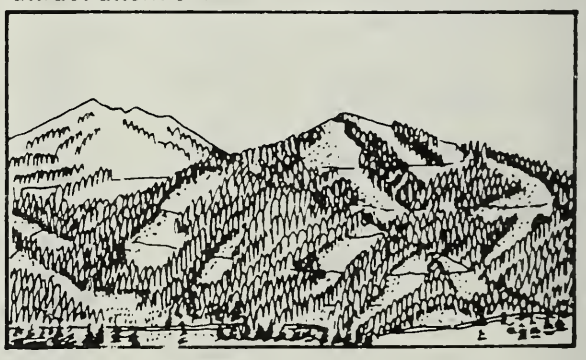
Changes are easily noticed and attract attention.



VQO Maximum Modification

VC V Major Disturbance

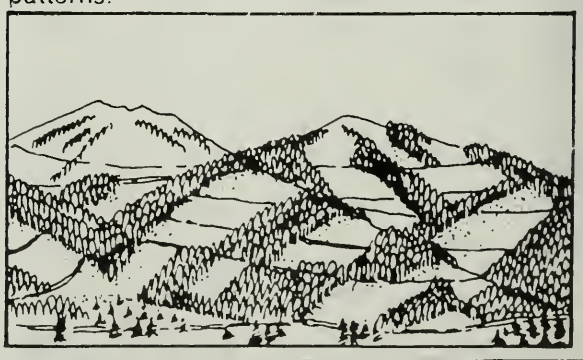
Changes are very strong and attract attention.



VQO Unacceptable Modification

VC VI Drastic Disturbance

Changes are in glaring contrast and disharmony with natural patterns.



ALTERED CHARACTER DOMINATES

Existing Visual Condition

Figure 3-14 illustrates the second primary baseline inventory of the forest landscape, the existing visual condition (EVC). The EVC defines how the Forest presently looks, in terms of how much evidence exists of human alterations.

The distribution of lands in each level is displayed in Figure 3-15

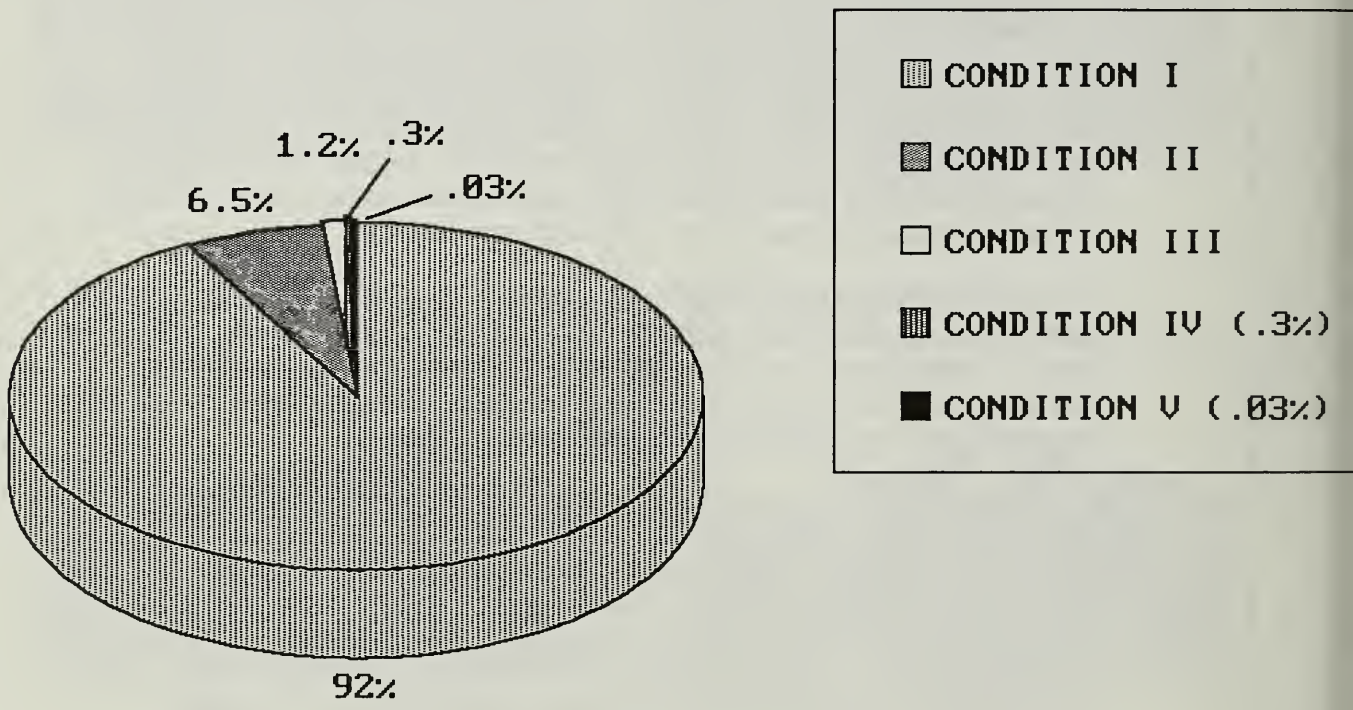
Because of the limited access, use and habitation of the islands up to this point, their overall appearance is quite natural with relatively isolated cases of changes created by humans. Figure 3-15 shows that the vast majority of the management area, 98.5 percent, is still natural in appearance. Only 1.5 percent of the landscape is noticeably altered and only about 0.3 percent of the landscape is actually dominated by human alterations. Examples of activities that have visibly affected the landscapes are the timber harvests along the inside of Montague Island that occurred in the 1970s and that are now largely revegetated, recreational cabins, navigational aides, ADF&G regulatory signs, and even beach debris left by the tides. Most of the impacts are relatively localized and minor and detract little from the overall sense of a landscape shaped much more by natural than human influences. Natural processes such as glaciation, landslides, weather and even earthquake fault patterns and uplift have shaped the overall landscape much more than have humans.

Thus the Big Islands Management Area landscape, generally, is currently in a much more natural condition than required by the visual objectives. According to the forest plan, the objectives require 3.5 percent of the land base to remain natural in appearance, and 25.4 percent to remain predominately natural, but allow 71.1 percent of the landscape to be dominated by human-caused alterations.

A few cases do exist where landscapes have been altered in excess of the levels specified by applicable visual objectives. The FAA facility east of Johnstone Point is one notable example where the existing landscape has had major modifications. This type of situation indicates a need for visual resource rehabilitation in order to bring the landscape into compliance with the objective. Visual resource rehabilitation can allow natural processes to improve conditions over the course of time as well as permit more proactive strategies designed to achieve compliance with the objective.

Less than 0.4 percent of the management area, 1,237 acres, can currently be classified as requiring visual rehabilitation.

Figure 3-15 Existing Visual Condition - Big Islands Management Area



Visual Quality Index (VQI)

The VQI quantifies the cumulative visual quality of the study area. It reflects both the inherent scenic value of the natural landscape (variety class) and the amount of human modification (visual condition) of the landscape. The VQI for the existing visual condition is 98.6 percent. As a reference, if none of the management area had been altered by humans, the index would be 100 percent. If all of the land base had been drastically disturbed, the VQI would be 30.2 percent. If the visual conditions of the area corresponded precisely to those called for by the visual objectives, the index would be 63.8 percent. It also shows, however, that the visual condition has declined from its origina natural condition.

While not a measure of how altered the landscape is currently, another indicator, visual absorption capability (VAC), does provide a sense of how visible a given activity will be in a given landscape. A comprehensive VAC inventory was not conducted for the MAA but qualitative observations were made to assist in the evaluation of the consequences of potential management activities. Many of the areas that have been identified for potential timber harvest activities have a relatively high VAC primarily because of their minimal slopes. Most of the Nellie Martin River and Strike and Deception Creeks drainages can be included in this category.

Cultural Resources

The Big Islands Management Area of Prince William Sound was occupied prehistorically by several of the eight tribes comprising the Chugach Eskimo Nation. The Shallow Water People lived on the eastern half of Hinchinbrook Island and all of Hawkins Island. The western half of Hinchinbrook Island was inhabited by the Nuchek People while Montague and Green islands were occupied by the Montague Island People. The prehistoric Chugach were a maritime-oriented people whose activities only rarely penetrated inland. The specifics of their culture and environmental setting are provided in detail in the Cultural Resources Overview of the Chugach National Forest (Revised November, 1987).

The affected environment of the Big Islands Management Area also includes cultural features of historic significance related to the current dominant western culture. These include evidence of mining, timber harvesting, fox farming, fishing, hunting and trapping.

Fewer than 50 cultural sites have been identified on the national forest lands in the management area. The majority of these sites have been selected by CAC, under Section 14(h)(1) of the Alaska Native Claims Settlement Act(ANCSA) but the status of their selections has not yet been determined. Field surveys to locate all potentially eligible National Register sites have not been conducted except as project needs have dictated. The Native-selected historic and cemetery sites [ANCSA 14(h)(1)] are still undergoing field verification for potential conveyance. Only two sites likely eligible for the National Register of Historic Places have been identified on the north end of Montague Island.

Prehistoric and historically documented human use patterns of the Big Islands Management Area allow for the development of a predictive model of sensitivity zones for cultural resources. Since evidence indicates prehistoric use of the islands was generally limited to the litoral zones of less than 100 feet elevation above tide level and historic use followed the same pattern, this strip of land is considered to have the

highest potential for cultural resources. Prehistoric uses which differ from this general model include some hunting, gathering and burial practices.

Historically, mining activity frequently occurs outside the model in that their activities carried them to all areas of the land base. Zones of high sensitivity include identified mineral deposits, recorded portages or corridors of human movement, and drainage systems identified as having or capable of having anadromous fish runs in the past. The zone of low sensitivity or low probability for human presence (hence low cultural resource potential) includes areas of permanent ice and snow, swamps, bogs, active stream channels and alpine rock fields. Areas of 1,000 feet elevation and higher, unless already included in one of the high sensitivity zones, are also included. All other categories of human activity fall within an intermediate sensitivity zone. This model is more fully discussed in the Cultural Resources Overview of the Chugach National Forest (Revised November, 1987).

Hydrology

Stream flow on the management area varies with precipitation. Streams originating in low elevation areas along the outside coast have more moderated flows due to the lower precipitation there. Streams originating in mountainous parts of the management area have much higher total flow volumes. They also have a large variability between high and low flows. This is particularly true of high gradient streams that allow for rapid runoff. Montague Island offers the most extreme examples, where streams with small drainage areas can carry enormous amounts of water during storm events. A flood event on Chalmers River on the north side of Montague was measured in excess of 600 cubic feet per second (cfs) per square mile of drainage area. Events considerably larger than this probably occur but have not been recorded. By comparison, many similar drainage basins on the Kenai Peninsula show maximum flood events of 30 to 50 cfs/square miles.

The largest flood events on the management area generally occur during the period from September through December when the largest storms move into Prince William Sound out of the Gulf of Alaska. Flood effects from these storms are greatly reduced when part or all of the storm comes as snowfall. In this case, the storm moisture goes into storage rather than immediately to runoff. In December storms decrease in size and are more likely to come as snowstorms.

Snowmelt runoff from higher elevation areas on the management area tends to peak in May or June. However, these peaks are considerably smaller than the storm/flood events that occur during the fall. Montague Island has a number of small glaciers in high elevation areas along the north part of the island. These glaciers generally have a northern exposure, and runoff from the melting glaciers themselves generally peaks in late July or early August. These melt/runoff peaks are also much smaller than the rainfall runoff peaks which occur during the fall.

The streams on the management area are clear and carry very little sediment during normal flow conditions. However, during large flood events, these same streams can carry extremely large sediment loads, due to the erosive sedimentary rocks found in the management area.

On Montague Island, portions of several watersheds are covered by glaciers. Glacial action works to scour the bedrock under the ice and contributes silt and larger sediment to the stream system. Glacial sedimentation of streams occurs primarily during

the late spring and summer months. Glacial sediment loads on Montague Island are relatively small in comparison to stream sediment loads occurring during large flood events.

Active earth movement in the management area allows for both up and down movement of the islands themselves, and active faulting of the bedrock. The faulting and fracturing of the bedrock tends to make it more susceptible to erosion during flood events. Tectonic events that uplift the islands (Montague was uplifted as much as 38 feet during the 1964 earthquake) can cause a sudden steepening of stream gradient at the coastline. This, in turn, can cause the stream to "headcut," meaning that it incises itself more deeply, starting at the coast and moving back upstream. This headcutting adds considerably to stream sediment loads and will continue until the stream gradient reaches a temporary equilibrium.

Tidal fluctuations influence the hydrology at river mouths along the coast. The average daily tidal fluctuation in the management area is about 12 feet. The maximum daily tidal fluctuation is about 19 feet.

Soils

There are three major ways in which the soil and landform characteristics are measured relative to the impacts from various management activities. These are the soil productivity, erosion potential and mass movements.

Soil productivity is normally measured by the amount and type of vegetation that the soil and other site factors produce. The factors common to the more productive sites include soils that are moderately deep to deep, well drained and have an organic layer more than two inches thick. These soils usually produce stands of large trees. Some soils are less productive because of thin organic surface layers, moderate drainage, shallow depths or low nutrient content; or they have non-compatible site characteristics such as avalanches, bedrock outcrops or unstable soils. These units will most often be vegetated with shrubs and herbaceous vegetation. Other soils have low productivity due to poor drainage or saturation by water. They are normally vegetated with herbaceous and hydric vegetation. Highland areas with rock outcrops, snowfields, and glaciers have a climate and other ecological conditions that are too harsh and unsuited for abundant vegetative growth. These are usually unvegetated or have minor amounts of moss or alpine vegetation.

Soil erosion and sedimentation is not a major problem because most soils are covered by an organic layer. Once the organic layer is removed, soils with a medium to fine texture are susceptible to erosion on steep slopes. Shallow soils regardless of the texture are more susceptible to erosion. Soils that do not have an organic layer or that are located on floodplains near rivers and creeks are continually being eroded as a natural process from stream erosion.

Naturally occurring landslides are a common occurrence in the management area. High precipitation, steep slopes, and continuous undercutting of sideslopes by streams all contribute to the landslides on the islands. The potential for landslides increases as slope increases and may become serious on slopes over 75 percent that have had the vegetation removed. They may also be accelerated where roads are constructed across slopes where the soils are poorly drained, have a fine texture or a high amorphous component.

Roadless Character

There is no designated wilderness on the Chugach National Forest, but 5,434,000 acres of land are capable of wilderness designation.(that is part of the National Wilderness Preservation System) Section 704 of the Alaska National Interest Lands Conservation Act(ANILCA) also specified the 2,116,000-acre Nellie Juan - College Fiord Wilderness Study Area be reviewed to determine the suitability or nonsuitability for preservation as wilderness.

The record of decision for the forest plan recommends 1,703,000 acres of the Nellie Juan - College Fiord Wilderness Study Area or 29 percent of the 5,995,010-acre Chugach National Forest for wilderness designation. This recommendation does not include any lands of the Big Islands Management Area.

Hinchinbrook Island is being managed consistent with maintaining primitive ROS class conditions until the forest plan is revised. The Forest Service will not schedule timber harvesting or road construction on Hinchinbrook Island prior to the revision of the forest plan. Other resource management activities consistent with the primitive ROS classification may be initiated prior to the revision of the forest plan.

Subsistence

Section 810 of ANILCA states:

"In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands the head of the federal agency having primary jurisdiction over such lands or his designee shall evaluate the effects of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for such purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency -

(1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805;

(2) gives notice of, and holds, a hearing in the vicinity of the area involved; and

(3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

During the March 1986 Joint Boards of Fish and Game meetings, Game Management Unit 6 (GMU) (Prince William Sound), was determined to be rural for purposes of subsistence uses of resources, except for Whittier and Valdez. Approximately 6,434

people (1984 estimate) reside in GMU 6. Excluding the populations of Whittier and Valdez, about 2,479 people qualify for subsistence uses of resources in Prince William Sound. The majority of these residents are from Cordova, Tatitlek and Chenega Bay.

The community of Chenega was extensively surveyed in 1986 to determine subsistence use patterns. The Alaska Department of Fish and Game Subsistence Division collected information on historic and current use patterns, harvest areas, species utilized, pounds of resources collected and consumed and harvest methods.

During April and May 1988, 19 of 31 households in the community of Tatitlek were surveyed. Alaska Department of Fish and Game (ADF&G) Subsistence Division mapped all areas used, areas used in 1987 and the most reliable areas for deer, goat, crab, shrimp, marine mammals, intertidal resources, waterfowl, marine fish, salmon, black bear, furbearers, vegetation and firewood.

As part of the information used to determine rural status, the Subsistence Division compiled a community summary for Cordova. That summary shows levels of household resource harvest and use for 1985.

In 1987, ADF&G conducted a hunter survey to determine deer hunter use patterns in Unit 6. Deer hunter use surveys have also been conducted in 1980, 1983 and 1984. The surveys show where residents and non-residents of Unit 6 were hunting and where they were successful.

These reports, as well as the recreation resource report for the Gravina-Big Islands Management Area analysis, were used to determine current subsistence use patterns in Prince William Sound and assess the impacts of proposed activities on subsistence resources.

The Board of Game has determined that black bear and mountain goats are subsistence resources used by local rural residents of GMU 6. No determination has been made for deer. Brown bear and moose are not used for subsistence purposes in GMU 6.

The ADF&G community summary for Cordova shows that all five species of salmon are used by a significant portion of the community. Halibut, dungeness crab, shrimp and bottom/rock fish are also used by large numbers of people. More than 64 percent of the households used deer. Alaska Department of Fish and Game survey report for 1987 estimated 2,669 deer were harvested by 1,906 hunters, not all of whom were Unit 6 residents.

Areas traditionally and currently used by residents of Tatitlek for subsistence use of resources have been mapped. No information has been collected on the intensity of use for these communities. However, the level and kinds of resources used is probably very similar to use patterns by residents of the community of Chenega.

Marine mammals make up 39 percent by weight of the Chenega community subsistence harvest. Salmon make up 21 percent, game 20 percent and other fish 16 percent of the harvest. Plants, birds and marine invertebrates each make up 1 percent of the harvest.

Per capita harvest of wild resources by Chenega residents was 361 pounds in 1985-1986 (1,286 pounds per household). Per capita use was 243 pounds (866 pounds per

household). This compares with a per capita harvest of 151 pounds and per capita use of 145 pounds by residents of Cordova.

Chenega residents use the Big Islands Management area to a limited extent for subsistence resources. Deer are taken from Green Island, Deep Bay, Mud Bay, Windy Bay and Gravina Point. In the 1960s deer were taken from Zaikof Point and Montague Point on Montague Island (Stratton and Chisom, 1986).

Both air and boat charter operators indicate that the majority of hunters that use the south end of Montague Island fly out of Seward or Anchorage. Use of the north end of Montague, Hinchinbrook and Hawkins islands is primarily by Cordova based hunters. Deer taken from hunters coming out of Anchorage or Seward cannot be considered to be used for subsistence purposes.

Figure 3-16 shows the estimated deer harvest for the management area between 1980 and 1987. Figures are taken from the 1987 Draft Alaska Deer Hunter Survey Game Management Unit 6 (Griese and Becker, 1987). Deer make up almost 13 percent by weight of the wild resources used by Cordova residents and 14 percent of the Chenega use.

Cordova residents reported 31 percent of the households harvested deer in 1985 and 64 percent of the households used deer. The average harvest per household was 218 pounds.

The majority of salmon used for personal use in Prince William Sound is harvested by commercial methods. This is true both for Chenega residents and Cordova residents. According to Stratton and Chisom (1986), 61 percent of the salmon used by Chenega residents is harvested commercially and an additional 29 percent comes from non-commercial nets or other methods. Salmon makes up 31 percent by weight of the wild resources used by Cordova residents and 20 percent of the Chenega use.

Figure 3-16 Average Deer Harvest Big Islands Management Area, 1980-1987

	1980	1983	1984	1987	Ave %
Montague Island	590	941	1138	980	45.0
Hinchinbrook Island	170	243	349	544	15.5
Hawkins Island	249	266	232	448	15.0
Green Island	52	48	66	33	2.5
Total Unit 6	1310	1951	2198	2669	100

Deer hunting areas important to Unit 6 hunters are, in descending order of importance: south half of Hawkins Island, Zaikof Bay-Rocky Bay-Stockdale Harbor area of Montague Island, north half of Hawkins Island, northwest side of Hinchinbrook Island and northeast side of Hinchinbrook Island. The area around Zaikof Bay and Rocky Bay had the highest ratio of deer taken per day hunted during 1987.

Tatitlek hunters consider the Zaikof Bay-Rocky Bay area extending down to Port Chalmers important for deer hunting as well as the shoreline along the inside coast of Montague Island below Port Chalmers. Green Island as well as areas on Hawkins and Hinchinbrook islands are also important deer harvest areas. Areas there include the south end of Double Bay, Anderson Bay, Eagle Point to Bear Cape and the area north and south of Windy Bay.

Anchorage-based hunters concentrate most of their effort on Montague Island. The areas around Zaikof Bay-Rocky Bay-Stockdale Harbor, Hanning Bay-Macleod Harbor, and San Juan Bay-Patton Bay-Beach River areas are the most important areas hunted.

In l987, Unit 6 hunters accounted for 32 percent of the hunting days and 49 percent of the deer killed. Other Alaskans accounted for 30 percent of the hunting days and 23 percent of the deer killed (Griese and Becker, 1987).

Social and Economic

The management of resources and environmental conditions in the Big Islands Management Area affect the social and economic well-being of people living in Prince William Sound and other forest users. In this project area, the issues and concerns have ranged from favoring current dispersed recreation uses to more developed recreation uses and timber harvesting (Chapter 1). This section discusses the social and economic setting which will be affected by management decisions.

Because activities in the project area are linked to the Chugach National forest plan, the area influenced by decisions in this document includes the following census areas/subareas: Anchorage Borough, Kenai Peninsula Borough, Matanuska-Susitna Borough, Valdez-Cordova, and Prince William Sound.

Population

An estimated 325,000 people live within the five census areas. Eighty-five percent are in the greater Anchorage area (Anchorage and Mat-Su boroughs). The population growth trend in the influenced area has been negative over the last few years, and is now growing very slowly. Estimates of future population growth to 1991 are on the order of about one percent per year.

With these low population growth rates, the demand for the use of all forest resources will not increase appreciably from this source. The increased demand for the use of all forest resources is expected to result from investments in new plant and equipment in the forest products industry, and increases in tourist visitation to the influenced area.

Socioeconomic Overview

The socioeconomic sphere of influence of the Big Islands Management Area potentially includes the communities and settlements within Prince William Sound, as well as residents of Anchorage and Seward. After reviewing available socioeconomic data and public involvement information, the interdisciplinary team (IDT) concluded that the primary communities affected by allocation and management decisions contained in the Big Islands MAA are Anchorage, Seward and Cordova. Anchorage residents use the area for a variety of recreational activities, while certain occupational sectors in Seward would benefit from tourism, logging and wood processing activities occurring

in the management area. Cordova residents use localized areas within or adjacent to Hawkins, Hinchinbrook, and Montague islands for a variety of economic, recreation and subsistence purposes. Secondary communities whose use of the area is less frequent include Chenega, Tatitlek, Whittier and Valdez.

In general, the smaller communities, including Seward and Cordova, depend to some degree on resources from the forest and marine environments for employment, recreation and subsistence. Lifestyles are characterized by remote living conditions, seasonal and cyclical employment opportunities, and escape from the problems of crime, crowding, noise and pollution often associated with urban environments.

Many of the small communities are attempting to strike a balance between their desire to maintain relatively undeveloped natural environments, with their desire for increased economic opportunities and community growth. Debates over these issues are reflected in the comprehensive plans, coastal management programs, and natural resource management plans that have been developed by state fnd Federal agencies in Southcentral Alaska.

In addition, some Anchorage residents use the management area (especially Montague Island) for a variety of recreational activities including kayaking, pleasure boating, deer hunting and fishing. Much of this use occurs in conjunction with visits to Forest Service public use recreation cabins.

The following community profile information is presented to describe the socioeconomic dimension of the affected environment, and to provide the socioeconomic context for understanding and selecting among the different planning alternatives.

Community Profile Summaries

The following community profile information was developed from existing sources available from state and federal agencies, non-profit corporations and the communities themselves. Summary socioeconomic data for each community, if available, are presented for such variables as population, employment and recreational or subsistence use of renewable natural resources.

1.Cordova. The community of Cordova is located on the mainland in eastern Prince William Sound. It is accessible by the Alaska Marine Highway System and by commercial jet service, as well as commuter air service. The principal economic sector is commercial fishing.

Cordova's population has been relatively stable after a period of steady growth. The 1980 census estimated that approximately 1,879 people were living in Cordova. Of these, 1,446 were white, while 231 were either Aleut, Eskimo or American Indian. Others included Blacks, persons of Spanish origin, and Asian and Pacific islanders. (U.S. Department of Commerce, 1981.) The Alaska Department of Labor estimates that the 1985 population of the city proper was 1,901 people (Alaska Department of Labor, 1985). In addition, approximately 441 people were living outside the city limits (City of Cordova, 1986). In total, about 2,342 people were residing in the greater Cordova area in 1985.

Development of the Bering River coal mines and the Katalla oil fields around the turn of the century were major factors in the establishment of modern Cordova. The primary impetus to sustained growth, however, was the discovery of copper and the

subsequent construction of the Copper River and Northwestern Railway. During the period between 1906, when railroad construction was initiated, and 1938, when the mines closed, Cordova functioned primarily as a transportation center. Due to its proximity to prime fishing grounds, Cordova's economy today is dominated by fishing and fish processing. Other sectors of the economy include transportation, communication and utilities, construction, retail trade and services (such as finance, insurance and real estate), and local, state, and federal government. Although there have been short-term periods of cyclical increase and decline, employment appears to be relatively stable. (Professional Fisheries Consultants, 1985; City of Cordova, 1986.)

Residents of Cordova rely heavily on the adjacent land and marine environment for recreational activities such as boating, camping and sightseeing, and for the subsistence harvest of a large variety of species. Recreation use information provided by the Cordova District Ranger indicates that recreation use (by both Cordova residents and non-residents) approximated 120,100 visitor days of participation on the Cordova Ranger District in 1986. (USDA Forest Service, 1986). The overwhelming amount of this use (105,100 recreation visitor days) occurred in undeveloped, dispersed areas. The three recreation activities in which people most frequently engaged were power boating, auto travel and tour boat use, which accounted for 31,200, 14,200 and 12,000 recreation visitor days, respectively.

The importance of hunting, fishing, and gathering activities is reflected by data collected by the Alaska Department of Fish and Game, Division of Subsistence, in 1985. A sample of 206 households were interviewed. Preliminary data suggest that the average Cordova household harvested approximately 400 pounds of fish, wildlife and plants. Of this sample, 59 percent harvested silver salmon, 44 percent harvested red salmon, and 30 percent harvested king salmon. This harvest represents 14,623, 7,628 and 7,985 pounds respectively. Nearly a third of the sample households harvested deer. A total of 218 deer were taken, representing 8,720 pounds. Through sharing of deer meat, nearly two-thirds of the sample households indicated they used deer meat. (Alaska Department of Fish and Game, n.d.)

2. Chenega. The village of Chenega was originally located on the south side of Chenega Island in southwestern Prince William Sound. During the Good Friday earthquake of 1964, a tidal wave generated by the earthquake destroyed the village and killed 23 residents. Survivors were relocated to Tatitlek, Cordova, Valdez and Anchorage (North Pacific Rim, n.d.; Stratton and Chisum, 1986.) A move to re-establish the community gathered momentum in the late 1970s. A site was selected on Evans Island, approximately 35 miles from the original village. Resettlement began in 1983 and continued through the fall of 1984. Motorized access is by float plane or boat.

Although estimates vary, reliable data by Stratton and Chisum (1986) indicated that the population of Chenega stood at 57 in 1985. Alaska Natives comprised 77 percent of the population, while the remaining 13 percent consisted of whites, primarily schoolteachers and their families. Residents of Chenega have strong ties to the Prince William Sound area. According to Stratton and Chisum (1986), 70 percent of the Chenega residents were either born in the Prince William Sound region, or had parents living in the area at the time they were born. Further, in nine of the 16 households interviewed in 1985, at least one of the adults living in the households was originally from the old village of Chenega. In four additional households, at least one adult had relatives from the old village.

The governing body of Chenega consists of an Indian Reorganization Act (IRA) Council that is responsible for a variety of governmental functions, including planning and community development, health and safety, and education. In 1986, the village possessed a recently-installed water treatment plant, a sewer system and a 100 kilowatt power plant. The community also employed a village public safety officer and a health aide. In 1986, 18 children were enrolled in the school. Three full-time teachers, a part-time aide, and a maintenance worker staffed the school. Commercial goods are available to Chenega residents through the community store.

Employment opportunities in Chenega are severely limited and highly seasonal. In addition to government employment, construction and commercial fishing are the primary economic activities in Chenega. Twenty-five of the 57 residents responding to the Stratton and Chisum (1986) survey indicated some level of seasonal employment within the previous year. They found that, when averaged across the total employed population, the average length of employment was 4.9 months per person in 1985-86, down slightly from the average of 6.4 months per person during the 1984-85 period.

Subsistence use of fish, wildlife and plant resources may compensate somewhat for the lack of employment. During the 1985-86 period, residents of Chenega harvested an average of 1,286 pounds of edible resources per household. On a per capita basis, this represents 361 pounds of fish, wildlife, and plants per person. Principle species harvested in terms of total number of pounds include salmon (all species--286 pounds per household), marine mammals (500 pounds per household), deer (183 pounds per household), and halibut (156 pounds per household). In addition, a wide variety of other fish, shellfish, waterfowl, furbearers, land mammals and plants were utilized by the community. Although subsistence harvest activities are somewhat concentrated in the areas around Evans Island, maps of subsistence use indicate that Chenega residents range extensively over much of Prince William Sound in harvesting subsistence resources. Deer harvest, for example, took place on Hawkins and Montague islands, while marine mammal harvest occurred as far north as College Fiord. (Stratton and Chisum, 1986).

3.Seward. The community of Seward is situated at the head of Resurrection Bay on the Kenai Peninsula. Seward served as the major port and point of shipment to Anchorage and Fairbanks from the time it was established in 1903 until the 1964 earthquake. Currently, it serves as the southern terminus for the Alaska Railroad, and it is also accessible by all-weather highway from Anchorage. The Alaska Marine Highway provides transportation between Seward and certain communities in Prince William Sound and on the Kenai Peninsula. The fact that government is the major employer in Seward contributes to the relative stability of the population. From the 1980 census through mid-year, 1985, the population had grown by 309 people, from 1,843 to 2,152--a 17 percent increase (Alaska Department of Labor, 1987). In 1980, the Native population stood at 238, while the white population totalled 1,564 (U.S. Department of Commerce, 1981). A census conducted in 1982 by the Kenai Peninsula Borough indicated that the Native population had increased to 325, and comprised 18 percent of Seward's total population (North Pacific Rim, n.d.).

Principle components of the economy include local, State, and Federal government, commercial fishing and fish processing, and tourism. Government institutions provide relatively stable employment when compared to the cyclical nature of resource extraction industries such as timber or fishing. The labor force in the Seward census District grew from 1,362 in 1974 to 1,967 in 1984. Employment increased from 1,141 to 1,678 between 1974 and 1984. Total employment in the Kenai-Cook Inlet Census Division

increased 122 percent from 1974 to 1984, but "the Seward area saw its total employment increase less dramatically with 47.1 percent growth over the 10-year period and 11.7 percent between 1983 and 1984", (Kenai Peninsula Borough, 1988). Historically, the unemployment rate in Seward has ranged from a high of 16.7 percent in 1965 to a low of 11.9 percent in 1975 (Simpson Usher Jones, 1979). The unemployment rate decreased slighty over the 1974-1984 ten-year period from 16.2 percent to 15.0 percent. (It is important to note that that portion of the workforce employed in the fisheries harvesting industry is generally self-employed--and are, thus, not reported in State employment/unemployment statistics.)

Seward residents engage in a variety of hunting and fishing activities. Seward is a popular recreational destination for pleasure boating and salmon fishing; it hosts one of the most popular salmon derbis in Alaska. An important component of the city's comprehensive plan was to develop much-needed recreational facilities for residents and tourists alike (City of Seward, 1985). Seward serves as the entry point for most of the visitors using the south end of Montague Island.

4.Tatitlek. The village of Tatitlek is located between Valdez Arm and Port Fidalgo on Tatitlek Narrows in northeastern Prince William Sound. It is accessible by boat and by small aircraft. The population of Tatitlek was determined to be 68 in the 1980 census. Since then, it has risen to 110 in 1984 and 112 by mid-1985 (Alaska Department of Labor, 1987). Of the 68 people living in Tatitlek in 1980, 53 were Alaskan Natives, while whites numbered 14. Tatitlek residents rely primarily on fishing and fish processing for their livelihoods. The North Pacific Rim Corporation conducted a survey in Tatitlek in 1981 which indicated that over 60 percent of the Native households have incomes of less than $15,000 per year, while 44 percent of the Native households have incomes of $10,000 or less (North Pacific Rim, n.d.). Tatitlek has an IRA Council form of government which provides a number of community services including community planning, bulk fuel storage and operation, and operation and maintenance of the community water, sewer, solid waste and electrical systems. The IRA government is attempting to encourage local economic development that is stable, yet culturally acceptable to the community (North Pacific Rim, n.d.).

Subsistence harvest and use of renewable natural resources play a major role in Tatitlek. The North Pacific Rim survey indicated that 83 percent of Tatitlek households engaged in at least one subsistence activity.

5. Whittier. The City of Whittier is located at the head of Passage Canal at the western edge of Prince William Sound. The economy is dominated by government, commercial fishing and tourism. Whittier is served by the Alaska Marine Highway System and the Alaska Railroad.

Unlike many of the other communities in the Prince William Sound region, Whittier's population is subject to extreme fluctuations, due in part to the special circumstances surrounding the establishment of the community and subsequent development. Whittier's initial population increase was associated with the U.S. Army base. Population rose to nearly 1,000 in the 1950s, only to experience precipitous declines when the base was decommissioned. The 1970 census counted 130 people (City of Whittier, 1988). In addition to the seasonal influxes of recreation visitors during the summer months, Whittier's permanent population continues to vary considerably. In 1980, the population stood at 198. By 1984, it had increased to 268. In mid-1985, the Alaska Department of Labor estimates that the population of Whittier was 344 (Alaska

Department of Labor, 1987). Of the 198 people inhabiting the community in 1980, 17 were Alaskan Natives.

Major components of the Whittier economy include government, transportation services, commercial fishing and fish processing, retail trade and services, and recreation/tourism. state, federal and local government employment contributes about two-thirds of the full-time jobs in Whittier--approximately 50 in 1988. The retail trade and services sectors--including motels, bars, restaurants and grocery stores--serve both local residents as well as tourists. Halibut and shrimp fishing are the major commercial fishing enterprises in Whittier. The 15-20 halibut boats that operate out of Whittier land approximately 20,000 pounds per year. Approximately 15-20 Whittier-based boats fish commercially for shrimp. About two-thirds of the shrimp harvested in Prince William Sound are either processed in or shipped through Whittier. Whittier serves as the entry point for recreational boat traffic to enter Prince William Sound from residents of mainland Southcentral Alaska. Tourists also arrive in Whittier via the Alaska Railroad from Anchorage. They also come on the Alaska Marine Highway and as passengers on one of the 57 cruise ships that now make Whittier a port-of-call. Tourism and, to a lesser extent, recreation use, are transient activities in Whittier, largely nonexistent in the winter months but providing large seasonal influxes during the summer (City of Whittier, 1988).

Further community expansion and development is hampered by the existing land ownership pattern. Although approximately 17 square miles are contained within the city limits, a significant portion of the land is owned by the Federal and State governments. This restricts residential and business development. Residential subdivisions have been proposed for some of the land the city selected from its state entitlements.

Located as it is in protected waters in close proximity to Prince William Sound, recreation activities of Whittier residents are marine-oriented. Residents and visitors alike participate in motorboating, sightseeing, sportfishing, sailing, crabbing and recreational shrimp fishing in Prince William Sound (City of Whittier, 1984). Whittier's boat harbor provides a base of support for these activities, and the popularity of marine-related recreation in Prince William Sound is supported by the fact of a five to seven year waiting period for a slip.

6.Valdez. The City of Valdez is located at the head of Port Valdez, a fiord in northern Prince William Sound. Access to Valdez can be gained by commuter airline, the Alaska Marine Highway System and via the Richardson Highway. Extensive damage from shock waves and subsequent tidal waves resulted from the 1964 earthquake. After the earthquake, the community was relocated and re-established to a new site thought to be more safe in the event of future earthquakes. Valdez is a first-class city, home rule form of government. Valdez serves as the southern terminus of the trans-Alaska oil pipeline.

Population has been relatively stable during the 1980s. The 1980 census identified 3,079 residents. The population saw an increase to 3,388 in 1984, but declined slightly to 3,271 by July 1985 (Alaska Department of Labor, 1987). The 1980 census indicated that the racial composition of Valdez included 2,745 whites, 175 people of Alaskan Native origin. Other residents included 63 Asian and Pacific islanders, 49 people of Spanish origin, and 38 blacks.

The economy of Valdez is supported by tax revenues from oil and gas property. In 1983, for example, Valdez collected oil property tax receipts in the amount of

$17,918,701. Although the petroleum industry is the mainstay of the Valdez economy, the economic base is fairly well diversified. Statistics available through 1983 indicate that, although employment opportunities are cyclical in nature, they are spread throughout a variety of economic sectors including construction, transportation, communications, public utilities, wholesale and retail trade, commercial fishing and fish processing, other private sector services, and federal, state and local government agencies (City of Valdez, 1986). Fish processing is expected to experience major growth and contribute additional employment opportunities. The tourism sector has grown rapidly. Commercial tours and charter services, exploiting such attractions as sportfishing and the nearby Columbia Glacier, operate during the summer season providing seasonal jobs.

Information provided by community workshops and surveys conducted for the coastal management program indicate that the most important lifestyle values expressed by Valdez residents were the natural setting and small town character, the coastal environment, recreation opprtunities, employment opportunities, and hunting and fishing. Over half the respondents expressed interest in fishing, saltwater boating and hiking (City of Valdez, 1986).

Economy

Natural resources are important to the economy of Southcentral Alaska. Fishing, fish processing, recreation, tourism and wood products have had a historical importance in regional employment.

As of 1988, the proportion of employment to total employment in the influenced area, by resource dependent use was as follows: fishing and fish processing, 30 percent; recreation and tourism, 30 percent; and wood products, one percent.

As with the State of Alaska as a whole, the Southcentral Alaska economy has been affected by the downturn in oil prices. The Municipality of Anchorage has been particularly hard hit, with significant declines in the retail sales, housing and transportation sectors of the economy. Future recovery of the economy in light of current oil price levels is uncertain at best, and emphasizes the importance of other natural resource based industries in maintaining or improving employment opportunities in the area.

Current and Future Demands for Forest Use

Recreation and Tourism

The management area of Prince William Sound is generally undeveloped and supports a variety of recreation activities that are dependent on a number of factors. Current recreation use of the area is minor relative to the rest of the Forest due to lack of access. Access is limited to aircraft or boats. The commercial fishing fleet makes recreational hunting and fishing use of the area during closed periods and before and after fishing seasons. Access by aircraft is provided chiefly by air taxi services for recreational hunting and fishing use.

In terms of public sector facilities, there are nine public recreation cabins in the management area. The total capacity of these cabins is 53 persons at one time. All of the Forest Service cabins receive moderate to heavy use. Requests for cabin use

have exceeded the capacity of the existing facilities on the forest, and has been greatest for the cabins on south Montague Island.

Recreation use for the management area was estimated at 25,000 recreation visitor days (RVDs) in 1986, including 5,800 in developed sites (recreation cabins) and 19,200 in dispersed areas. This compares with an estimated 14,800 visitor days shown in the 1984 forest plan, based on 1981 Recreation Information Management (RIM) data. This 59 percent increase in visitor days is due to both actual increases in use and improvements in the data collection process. The major uses are boating, viewing scenery, cabin use, and deer hunting in the management area.

Tourism has increased substantially over the last five-ten years in Prince William Sound as a whole. As an example, tour boat dockings annually have increased from zero in 1980 to 88 in 1988. In the Big Islands Management Area, private sector tourism services, in addition to air taxi services, emphasize outfitter/guide services. Services provided include guided hunting and fishing, and drop-off service with a temporary camp. Current tourism services include seven outfitter/guides, cruise ships, flightseeing, and the MacLeod Harbor Lodge.

Commercial and Sport Fisheries

Prince William Sound, including the management area, is noted for its commercial and sport fisheries for salmon, herring, halibut, bottomfish, crab and shrimp. In 1987, 1,067,000 pink salmon and 35,000 chum salmon were harvested in the waters adjacent to the Big Islands Management Area. The total estimated commercial value was $1,281,951 or about three percent of the entire Prince William Sound salmon fishery.

The value should be considered a minimum since some of the catch may have been delivered to tenders in other districts. The commercial catch and relative proportions of the catch in the different districts also differ from year to year depending on the strength of the runs, the timing of the fishery openings, and the distribution of the fishing effort. Interception of fish bound for other spawning areas is unknown but is assumed to be minimal. Approximately 82-88 percent of the wild stock pink salmon and 97.5 percent of the wild stock chum salmon produced within the management area are produced on national forest lands.

Streams and lakes in the management area and the adjacent saltwater areas support a substantial sport fishery. Several stream systems in the planning area are well known for their sport fisheries; the most popular areas include the Nellie Martin River, San Juan Bay, Shelter Bay and Makaka Creek. Other popular sport fishery areas are associated with forest recreation cabins. The magnitude of the sport fish harvest in the management area and the economic values are unknown.

Hunting and Trapping

The management area is commonly used for brown bear and deer hunting. About 20 percent of the brown bear and 75 percent of the yearly deer harvest in the Prince William Sound area occurs within the management area. In addition, about 50 percent of the brown bear and five percent of the deer hunters are non-residents. Current hunting use within the management area is estimated at 1,300 hunters over 6,000 hunting days.

Timber

The importance of timber in the project area (south Montague Island) is linked with the timber supply in the overall Big Islands Management Area. Timber from the Chugach National Forest is used locally for rough cut dimension lumber and planed dimension lumber from the new mill at Seward.

The market area served by the Big Islands Management Area also receives timber from Prince William Sound, part of the Cordova Ranger District, the Kenai Peninsula and part of the Seward Ranger District. Currently, the forest supplies about 10 percent of all the timber used in the dimension lumber markets. The forest does not supply logs for the export market.

Timber harvest on private lands within the market area has been directed towards log exports. With completion of the new 20 mmbf dimension lumber mill at Seward, however, private harvested timber in Prince William Sound and Montague Island will also be used for lumber production. In Fiscal Year 1988, 85.6 mmbf of timber was either exported as logs or processed as dimension lumber in Southcentral Alaska, with a total value of $34 million.

Short-term expectations in Pacific Rim markets for lumber and wood products from Alaska are good. Continued expansion in the United States and the Pacific Basin coupled with a more internationally competitive dollar fueled rapid growth in Alaskan exports of forest products in 1988. The value of forest products exported to foreign countries from Alaska has increased from $204.5 million in 1985 to $474.7 million in 1988. The boost in competitiveness from currency shifts and market growth lifted prices for some Alaskan forest products exports to record levels.

International exports of softwood logs from Alaska exceeded $260 million in 1988, growing 10.5 percent in volume from 436 mmbf in 1987 to more than 482 mmbf in 1988. The average market value for all log exports reached a record $543 per mmbf. The value of Alaskan lumber exported to foreign destinations has more than doubled over the last two fiscal years, rising from $24.7 million in 1986 to more than $52 million in 1988. Within the next year, continued expansion is expected as several Alaskan lumber processors begin production in new facilities. Lack of kiln and custom cutting facilities continue to plague efforts by Alaskan lumber manufacturers to tailor output to the specific needs of wholesalers and end-users abroad. A shortage of transoceanic containers and rising freight rates further compound, but have not prevented, increased diversification with an emphasis on processing to add value to the Alaskan-produced product.

Chapter 4
Environmental Consequences

Chapter 4
Environmental Consequences

Introduction

This chapter discloses the environmental consequences of implementing the alternatives described in Chapter 2.

Environmental effects or impacts can be direct, indirect, or cumulative. The terms "effects" and "impacts" are used interchangeably. They can be quantitative or qualitative, short or long in duration, adverse or beneficial, real or potential.

Combinations of effects occurring over time can produce cumulative effects. Activities on adjacent lands in different ownerships must be taken into account. These activities, occurring in the same general location over a defined period of time, are incremental and can produce cumulative effects.

All past, present and potential future resource management and the transportation systems associated with this management were included in the cumulative effect analysis.

The assessment of effects assumes compliance with policies and standards established in the 1984 Chugach National Forest Land and Resource Management Plan (amended 1986), regional standards, guidelines, and other policies, and federal laws and national policies. Standards and guidelines in the document are already incorporated in the analysis of the proposals and will apply to planning and management of the project area.

The analysis of cumulative effects of combined activities on national forest and private land assumes the private landowner will comply with the State Forest Practices Management Act and other state or federal requirements.

Forest programs will continue to be monitored and evaluated. A monitoring plan was prepared in the forest plan as amended, and will be applied. This has been supplemented in this document as needed and will ensure compliance with forest policies and standards and guidelines. Through the monitoring process, identification of research needs will be made to complement the monitoring plan.

Special Uses

In all action alternatives new special uses would be permitted consistent with the amended forest plan and standards and guidelines.

Alternatives 2 through 6 (Maps 5, 7, 9, 11 and 13) would have both adverse and positive effects on the MacLeod Harbor Lodge operation. Alternative 5 would provide an

opportunity to expand the capacity and services at the MacLeod Harbor Lodge. The natural character of south Montague would be changed by resource development activities.

Outfitter/Guide Carrying Capacity Estimates

The capacity determination (Appendix B) is not a proposed action, but if any actions were implemented using this information as guidance, the effect would be to maintain the desired recreation experience as defined by the recreation opportunity spectrum (ROS) class. Since coordination with Alaska Department of Fish and Game is required, there should not be any adverse effects on fish and wildlife populations. The estimates of social carrying capacity do not vary by alternative because there is no additional capacity in areas where use increases are indicated. The current permitted operators would not experience any change as a result of the estimated capacity. The current use of the areas by the general public would not be changed.

Minerals

All of the land managed by the Chugach National Forest within the management area is available for mineral exploration and development in all alternatives under the U.S. Mining Laws unless they are specifically withdrawn. The southeast portion of Green Island, Little Green Island and The Needle are the only areas that may be withdrawn if the area becomes a research natural area.

The potential mineral supply analysis for the Big Islands Management Area completed by the Bureau of Mines and U.S. Geological Survey indicated that there is a relatively low potential for mineral discovery and development for locatable minerals, and no major activities are expected to occur (Fechner and Hoekzema, 1988). One exception is for the potential discovery of copper and manganese on the southeastern portion of Hinchinbrook Island. This is expected to result in minor or no impacts to the land or other resources. The appropriate standards and guidelines will be used to regulate any exploration or development.

Geology

Roads and facilities constructed for the implementation of projects will be susceptible to damage from earthquakes. Roads may be damaged from landslides of the soil mantle where they are constructed on side slopes, buried by landslides that may occur on slopes above the roads, and from surface displacement where one portion of a road may drop relative to an adjacent portion. Fish enhancement projects, recreation cabins, and hardened campsites are also susceptible to damage or destruction from earthquakes.

Common variety minerals such as gravel and rock necessary for road development is available for development of roads, etc. The number of gravel locations for borrow pits will vary according to the amount of road development as proposed in each alternative and will be addressed in further NEPA documentation associated with development of any transportation system.

Access

New impacts from development of land access facilities would occur only on southern Montague Island. The remainder of the management area would not change due to

the absence of development projects requiring access. No roads or log transfer facilities (LTF's) are proposed for development on Hinchinbrook, Hawkins, Green, or Little Green islandsor The Needle.

Access Facilities except LTFs

All alternatives, except Alternative 1, increase the level of access on southern Montague Island. Currently the areas accessible are beaches which can be reached by boat or plane and upland open areas reachable by plane. The access proposed would add land vehicular traffic. Upland valleys and vegetated areas not reachable by plane could be driven to where roads are proposed. Even though approximately 22 miles of road would be built on beach zones, this would not increase access, only add another mode of access. Beach road would increase the level of use, dependant on the availability of vehicles on the island.

The level of access would not change for northern Montague, Hinchinbrook, Hawkins, Green, and Little Green islands and The Needle.

The increase in uplands access on southern Montague Island provides opportunities for recreation, fish, wildlife and vegetation management. New trails are proposed tied to road development to increase access to the alpine region. Recreational small boating would be increased from roads along salt and fresh water bodies in Alternatives 3-6. Fisheries enhancement projects which require road access could be implemented to maintain or increase habitat capability. Road access makes it possible to have a long-term vegetation management strategy.

The standards and guidelines (Appendix F) provide the means to mitigate adverse environmental impacts of the proposed road to resources except for the impact on roadless character. The standards and guidelines also apply to the implementation of source material sites.

The proposed arterial road in Alternatives 4 through 7 has to cross a saddle at an elevation of approximately 450 feet above sea level. In Alternatives 4, 5 and 7, the proposed road drops to the beach to the southwest along the west side of Strike Creek, while the Alternative 6 proposed road is on the east side of Strike Creek. To the northeast of the saddle both alignments decrease in elevation, although the elevation in Alternative 6 drops rapidly to Jeanie Cove.

The soils surrounding the saddle are a higher-risk soil type. Design and construction measures would be used to prevent soil erosion or mass movement. The controlling feature of the saddle mandates that the hauling period be restricted to snow free periods for Alternatives 4 through 7. Blading of the road would be required to clear minor snowfalls.

Anchor buoys would slightly increase recreation use in Zaikof Bay for Alternatives 2 through 6 because boaters would have safer anchor sites.

Recommendations resulting from airstrip feasibility studies could also increase air access to, and use of, the island.

New trails would be provided near MacLeod Harbor, San Juan Bay and Jeanie Cove in Alternatives 3-6, Stump Lake in Alternatives 2 through 6 and in Patton Bay in Alternatives 4, 5 and 6. Alternative 5 proposes a motorized trail between MacLeod Harbor

and the upper reaches of the Nellie Martin River drainage as well as a lateral ridge foot-trail connecting to San Juan Bay.

Exact location and design of pits and quarries for road construction would be identified before project implementation. Until then, quantity, type and quality of rock available is unknown. Pits and quarries would be designed according to the standards and guidelines to mitigate impacts to soil, water and visual setting quality. When opportunities are available, pits and quarries would be developed to be used for fish habitat enhancement.

Log Transfer Facilities (LTFs)

The Transportation Plan (Appendix D) includes a section solely on LTFs describing sites, feasibility and conceptual designs. The plan analyzes the potential sites for development. The site named Wooded Island LTF is not located on any of the islands in the Wooded Island group. It is located on a point of land on Montague Island across from Wooded Island.

The sites in MacLeod Harbor have had subsurface investigations of the aquatic biological and physical environment (Appendix D). Investigations have not been made of the aquatic environment for the Box Point or Wooded Island LTFs. This work would be done prior to issuing permits or site development.

The dive report for MacLeod Harbor states the sites at south MacLeod Harbor (site #3) and north MacLeod Harbor (site #5) are feasible sites. Salmon streams are near both sites, the lesser-producing stream is near south MacLeod. South MacLeod has limited macro-biota associated with this site. South MacLeod will require more fill on the intertidal zone than north MacLeod and has currents which would tend to spread bark and wood debris. North MacLeod Harbor has a greater amount of marine vegetation and fauna on a steeper sloped bottom.

Each LTF site, if developed, would also require development of a log storage area nearby. The log storage area would require clearing approximately 10 acres and constructing a gravel pad to stabilize the surface for heavy equipment to travel over while handling and placing the logs in the storage area. The stabilized pad would reduce the displacement of the soil layer by equipment and reduce the level of sediment transport which would have to be trapped from water run-off in the log storage area. For both MacLeod Harbor sites and the Wooded Island site, the log storage area would be on the uplands adjacent to the tideland LTF site. Box Point LTF log storage area would be on the upper tideland and adjacent uplands on the shore west of the LTF site.

Off-shore log rafting and storage would entail the placement of anchors and standing booms for holding log bundles while building rafts for towing or holding for loading onto barges. These areas would occur in a minimum depth of 40 feet of water. There would not be subsurface aquatic environmental disturbance. Loose bark falling from the log bundles would be dispersed by the currents.

Alternative 1 - No Action

This alternative maintains the roadless character of the entire Big Islands Management Area as it currently exists for the national forest. No national forest roads or log transfer facilities would be proposed. Chugach Alaska Corporation's (CAC) request

for access from Patton Bay to MacLeod Harbor across the national forest would not be granted.

Chugach Alaska Corporation would develop the land it owns at Patton Bay and MacLeod Harbor separately and solely within corporation boundaries with access from saltwater. This alternative would require CAC to build 2 LTFs, one in Patton Bay and one in MacLeod Harbor.

Roads for Alternatives 2 and 3

Under these alternatives, access is improved to national forest lands between MacLeod Harbor and San Juan Bay while the balance of the management area remains roadless.

The forest's resources are developed independent of any action taken by CAC for road development and LTFs. CAC and the Forest Service would not be coordinating management of roads and LTFs.

There would be approximately 11.6 miles of road along the beach from MacLeod Harbor to San Juan Bay. All remaining routes would occur on the adjacent uplands.

LTFs for Alternatives 2 and 3

Under these alternatives, three LTFs would be developed and independently operated. Chugach Alaska Corporation would develop sites at Box Point and north MacLeod Harbor. The Forest Service would develop a site at south MacLeod Harbor. Each site would need upland log storage sites. Each site would include offshore rafting and storage areas approximately 20 acres in size and in a minimum of 40 feet of saltwater.

Upland sort yards would be developed adjacent to or close to the shoreline site for each LTF. At both MacLeod Harbor sites, the upland areas would be developed directly adjacent to the LTF site. At Box Point the log storage area would be developed within 0.3 miles of the LTF.

When implemented, these facilities may be modified to allow for barges to dock and load logs without placing them into the water. The greatest difference between barging and rafting are the amounts of bark lost in the water and the cost of taking the logs to a milling point. Barging is lower in bark loss and approximately 100 percent higher in cost. Rafting may lose some logs during the tow to the milling point, assumed to be Seward.

Roads for Alternatives 4, 5 and 6

The transportation plan for these alternatives includes development of a system of roads from MacLeod Harbor to Patton Bay on southern Montague Island. The remainder of the management area is roadless.

Chugach Alaska Corporation and the Forest Service would jointly develop an arterial route between MacLeod Harbor and Patton Bay from which each would independently develop connected roads to their respective resources. The Alternative 6 arterial route follows the alignment proposed by CAC. The arterial route for Alternatives 4 and 5 propose a route which more effectively accesses the resources on the national forest, while still connecting CAC's two private land holdings. Much of the arterial route is

identical in all three alternatives. The difference in the routes is across the Jeanie Cove uplands. The Alternative 6 route is on the beach, Alternatives 4 and 5 are approximately 0.5 miles upland from the beach.

The road in Alternatives 4 and 5 would be developed on approximately 21.6 miles of beach. In Alternative 6, there would be approximately 23.0 miles of the road on the beach. The remainder of the roads on the national forest would be developed on the uplands.

The transportation system proposed in these alternatives increases the amount of National Forest System lands on southern Montague Island accessible to visitors ranging from 70 percent to 85 percent. Alternative 5 includes the highest level of anticipated recreation and timber hauling traffic on the road system. The greatest conflict between recreational traffic, primarily passenger vehicles, and timber hauling, primarily off-highway log trucks, would be on the arterial road from MacLeod Harbor to Patton Bay. Traffic levels would be monitored and, if conflicts arise, the management of the road would be reviewed and measures recommended to provide safe traffic patterns for all users.

LTF for Alternatives 4, 5 and 6

The proposed LTF is the north MacLeod Harbor site and is within the private ownership boundaries of CAC. This site has good upland log storage possibility, though smaller than the south MacLeod Harbor site. An offshore log rafting area is available with this site and has natural protection from the elements.

This site was previously used in the mid-1970s. If one of these alternatives is selected, it would be expected that both private and Forest Service timber sales would be handled on the north MacLeod Harbor site.

The same uplands and offshore development at the north MacLeod site would be utilized in all alternatives. There would be greater use in Alternatives 4, 5 and 6 than in Alternatives 2, 3 and 7. In Alternatives 4 through 7, south MacLeod Harbor and Box Point would not be developed as LTFs.

Roads for Alternative 7

A road for this alternative would be developed under a permit to CAC following the same alignment as Alternatives 4 and 5. This road would not be jointly constructed, used and maintained.

The road would be short-term and obliterated at the end of the permit and use by CAC. Traffic would be restricted to CAC log haul and Forest Service administrative vehicles only. The national forest lands would not be managed in such a way as to require development of further connecting road systems. This would be the only road developed in the management area for the life of this plan.

LTF for Alternative 7

The north MacLeod Harbor site would be the only LTF constructed. Its use would be by CAC only. No national forest lands would be developed requiring use of an LTF. Sites at south MacLeod Harbor, Wooded Island and Box Point would not be developed.

Cumulative Effects

Chugach Alaska Corporation is planning to build 56.2 miles of new road within their Patton Bay ownership. Chugach Alaska Corporation would have to reconstruct approximately 0.5 mile of inactive road within their MacLeod Harbor ownership.

Total road construction on southern Montague Island by CAC and the Forest Service would be 57.2 miles in Alternative 1, 95.8 miles in Alternative 2, 103.0 miles in Alternative 3, 115.9 miles in Alternative 4, 120.6 miles in Alternative 5, 121.5 miles in Alternative 6 and 91.8 miles in Alternative 7.

Cooperative road system development is not proposed in Alternatives 1-3 and 7. In Alternatives 4, 5 and 6, 49.0 miles of cooperative road system development are proposed.

The transportation system as described in Alternatives 4, 5 and 6 significantly increases the amount of accessible National Forest system lands on southern Montague Island. Even though the road proposed in Alternative 7 extends through all of southern Montague Island, it won't increase the amount of accessible National Forest land. It is short-term use by a permittee and would not be used for the management of National Forest land.

Alternatives 1, 2, 3 and 7 do not provide for cooperative use of LTFs. Chugach Alaska Corporation would develop LTFs and offshore rafting and storage areas at Patton Bay and MacLeod Harbor in Alternatives 1, 2, 3 and only in MacLeod Harbor in Alternative 7. The National Forest would develop one LTF and offshore rafting and storage area in MacLeod Harbor. There are two LTFs proposed in Alternative 1, three in Alternatives 2 and 3 and one at MacLeod Harbor in Alternatives 4 through 7.

Wildlife and Fish

The scoping process determined that the potential effects of management activities on wildlife and fish populations dependent on mature forested habitats, especially Sitka black-tailed deer and anadromous fish, were of major concern. This section documents the effects of the proposed alternatives on wildlife and fish through the use of management indicator species (MIS). The analysis examines the consequences of activities on Montague Island only. Actions proposed for this planning period, both private and Forest Service, are limited to Montague Island with the exception of a single Forest Service recreation cabin on Hinchinbrook Island. Wildlife and fish habitats on Hinchinbrook, Hawkins and Green islands would be maintained in their current condition and would continue to provide habitat capability in addition to that displayed for each MIS in the following analyses.

Important Considerations

Habitat Capability and Species Populations

The terms habitat capability and populations are usually not interchangeable. Habitat capability is synonymous with carrying capacity or the maximum number of individuals the habitat can support, whereas the population is the number of individuals actually present at a given time. Populations may temporarily exceed habitat capability. How-

ever, most populations are usually below what the habitat is capable of producing, due to winter mortality, predation or other ecological factors.

When mature forest is harvested, the habitat capability for species dependent on mature forest habitats will decline. If the population is near carrying capacity, the population will also decline. If the population is low, timber harvest may not affect the present population. However, as the population recovers, potential population growth will be reduced where timber harvest has occurred in important habitats.

The forest is currently working with state and other federal agencies having wildlife and fish management responsibilities to develop "desired population goals," but results are not yet available. Various factors, such as a need to maintain minimum viable populations and/or populations large enough to sustain public demand, both consumptive and nonconsumptive, need to be considered. Even with extensive timber harvest, it is possible that for some species habitat capability would be sufficient to maintain desired population levels and meet public demand. For others, habitat improvement projects may be necessary to meet these goals. The following analyses portray the consequences of implementation of the various alternatives using estimates of the changes in habitat capability for individual species.

Timber Harvest on Private Lands

Estimates of the cumulative effects of private timber harvest activities on wildlife and fish species on Montague Island were made based on the following information provided by CAC. Harvest unit boundaries had not been delineated and road locations were tentative.

1.All harvest would be completed within 10 years.

2.A total of 150 mmbf of timber would be harvested in the Patton Bay/Beach River area. Timber would be harvested in the MacLeod Harbor Area.

3. No harvest would occur within the national forest trail easements in the Patton Bay/Beach River area. Much of the timber near the uncataloged stream emptying into Patton Bay would not be harvested. No timber would be harvested on the Box Point peninsula.

4. A map was provided that delineated the tentative road network for timber harvest activities in the Patton Bay/Beach River area.

5. No road map was provided for the MacLeod Harbor area.

Based on the above information the interdisciplinary team (IDT) developed a map delineating expected private land harvest areas for estimation of effects. The map is available for review at the Chugach National Forest Supervisor's Office in Anchorage. The analysis assumes the following:

1.A total of 4,870 acres of timber (150 mmbf) would be harvested in the Patton Bay/Beach River area by 1999.

2.Approximately 586 acres (12 mmbf) of timber would be harvested in the MacLeod Harbor area by 1999.

3.A total of 2,810 acres of timber would be harvested in stream habitat zones (Appendix E). Harvest along streams will be consistent with the State Forestry Practices Act which generally allows harvest of timber adjacent to fish streams.

4.Analysis of effects of roading in the Patton Bay/Beach River area was based on the map provided by CAC. Effects of roading in the MacLeod Harbor area were limited to the proposed arterial road.

5.Based on Forest Service timber classifications, a total of 1,273 acres of productive forest land and 5,689 acres of unproductive forest land would not be harvested.

Effects Analysis Process for Management Indicator Species

The effects of management activities are measured through estimated changes in habitat capability, using the most important habitat components for each management indicator species (MIS). Management indicator species are wildlife and fish species of special concern or those representing special habitats (Chapter 3). Existing population levels for these species in the Big Islands Management Area are not available. Definitions of the wildlife and fish habitats used in this analysis are described in the following sections for each individual species. Habitats used for analysis for a given MIS may overlap with habitats defined for others.

Of the proposed actions, the loss of mature forest from timber harvest and effects from forest roading and increased human use have the greatest potential to impact the various MIS. The analysis of the effects on each MIS includes at a minimum the following sections: 1) short-term effects of timber harvest; 2) cumulative effects of Forest Service and private timber harvest; 3) long-term effects of timber harvest and 4) effects of roads and humans.

The short-term effects analysis examines proposed actions scheduled to occur between the present and 1999 on national forest lands on Montague Island. This analysis portrays the changes in habitat capability under the various alternatives on national forest lands only.

The cumulative effects section discusses changes in habitat capability on all ownerships on Montague Island as a result of timber harvest activities scheduled to occur between the present and 1999 on National Forest lands and adjacent privately owned lands on Montague Island.

The long-term effects analysis includes the effects of harvesting all the suitable productive forest on national forest lands on Montague Island during the life of the timber rotation. This harvest may or may not take place depending on decisions reached in future planning efforts. Effects from past harvest and proposed private harvest are included. Potential future harvest is not part of any of the proposed alternatives and is included in this analysis only to display the possible long-term cumulative impacts of all potential timber harvest on all ownerships on Montague Island during the rotation.

The "effects of roads and humans" section discusses the short-term, long-term and cumulative effects of proposed roads, trails, recreation facilities, logging camps and associated human use. Again, long-term increases in roading and access associated with potential future harvest may or may not happen.

Wildlife

Effects of timber harvest on wildlife and their habitats are variable and depend on the requirements of individual species. Following harvest, forest development follows predictable stages of succession. Primary habitat components affected by these changes are forage availability and quality and both thermal and hiding cover. Evaluation of the effects, both positive and negative, from timber harvest must be made in relation to changes in the availability, abundance and distribution of these habitat components for each wildlife species over time.

Roads and trails increase human access to wildlife habitats. Increased human presence in wildlife habitats can result in disturbance of normal habitat use patterns and increased mortalities from stress, related factors and legal and illegal harvest.

Alaska Department of Fish and Game Big Game Management subunits (Map 4), within the larger Big Game Management Unit 6, are used to summarize the effects of implementation of the various alternatives on wildlife MIS. Subunits are analogous to the hunt area subdivisions used by the Alaska Department of Fish and Game in summarizing information from the 1987 deer hunter harvest survey (Griese and Becker, 1988). Subunits 35, 36 and 37 encompass the entire area proposed for national forest and private timber harvest and roading activities on south Montague Island.

Retention of Mature Forest

Mature forest is characterized by the presence of large diameter trees, multi-layered canopies, a range of tree diameter sizes and the presence of understory vegetation. These stands are generally well past the age of maturity as evidenced by dead and dying trees, snags and other down woody material. Mature forest, as used throughout the following analysis, is analagous to the mature to overmature sawtimber size class discussed in the vegetation section of Chapter 3 (Map 17). The seedling/sapling, pole timber and immature sawtimber size classes (mature forest harvested between 1947 and 1973) are collectively referred to as second growth forest.

Approximately 21,465 acres of mature productive forest are currently available on Forest Service lands on Montague Island. Between 21,465 and 20,246 acres of mature forest would be maintained through the planning period for wildlife species dependent on mature forested habitats.

Mature forest habitats would be maintained throughout the rotation in several ways:

1.The interdisciplinary planning team (IDT) classified 885 acres of mature forest and 79 acres of second growth on south Montague Island for wildlife habitat retention under Alternatives 2 through 6 (Maps 6, 8, 10, 12 and 14). These areas were withdrawn from the suitable productive forest land base. The major impetus was to maintain important deer wintering habitats in close proximity to private lands where much of the deer winter habitat would be harvested and to protect other important beach fringe habitats. See discussion of suitablility determination in the vegetation section of Chapter 3.

In addition to wildlife habitat retention areas, mature forest habitats would be maintained on national forest lands on Montague Island through the end of the rotation, in lands classified as follows (Map 17):

1.Unsuitable or inoperable productive forest land (9,300 acres).

2.Unproductive forest land (65,000 acres)

3.Suitable productive forest in riparian areas that would not be harvested in this and future planning periods in compliance with the management area-wide standards and guidelines (Appendix F).

4.Alternative 2, Alternative 3 and Alternatives 4, 5 and 6 specify that 2,428, 2,077 and 1,235 acres, respectively, of suitable mature productive forest on Montague Island would be managed under the wildlife-visual/timber prescription (Appendix F). This prescription allows timber harvest but maintenance of wildlife habitat values would be emphasized.

Approximately 100 acres of mature productive forest and 1,000 acres of unproductive forest are present on state-selected lands on Montague Island. No harvest is expected to occur during the planning period.

Retention of mature forest on private lands on Montague is discussed in the previous section on timber harvest on private lands.

Sitka Black-Tailed Deer

General Effects of Timber Harvest

The capability of winter habitat to support Sitka black-tailed deer is a function of forage abundance and quality, snow interception qualities of the overstory and climate as influenced by aspect, elevation and maritime conditions (Hanley et al., 1987; Hanley and Rose, 1987; Kirchhoff and Schoen, 1987; Shishido, 1986). Deer populations also respond to hunting pressure and predators, where present. In the short-term, timber harvest converts mature forest into early successional shrub and forb stages. Clearcuts 0-25 years of age provide abundant forage and improve the opportunity for more deer to enter the winter in good condition, but lack canopy cover to intercept snow, thereby making most forage unavailable during moderate or deep snow years. In the long-term, timber harvest converts mature stands into even-aged, closed-canopy stands from 25 through 100 years. The closed canopies in second-growth stands intercept snow well and provide some thermal cover, but the lack of preferred browse species in the understory reduces the habitat capability for deer.

In most cases, timber harvest reduces both the short-term and long-term quality of deer winter range. It is assumed that once deer winter range is harvested, it is not replaced in the life of the standard timber rotation (100 years) and there is a corresponding loss in Sitka black-tailed deer production. The combination of a deep snow winter and large amounts of winter deer range converted to clearcuts or second-growth increases impacts to deer populations. However, even under unlogged conditions a deep-snow winter can kill many deer.

Effects of Precommercial Thinnings

The Forest Service in Southeast Alaska is experimenting with the manipulation of second growth stands to develop the characteristics of mature forest earlier than would naturally occur in terms of snow interception and forage production. Initial results are providing valuable tools and techniques to increase the value of second growth stands to wildlife.

Alternatives 2 through 6 propose to precommercially thin a total of 1,568 acres of second growth with an emphasis on improving the wildlife habitat values, especially for wintering deer (Maps 5, 7, 9, 11 and 13). Appendix H describes measures for specific thinning units. In the short-term, forage quantity, quality and diversity should increase and slash clearing would ensure accessibility to deer. The increased forage would be most available to wintering deer during mild winters but unavailable during severe winters. Brown bears should benefit from the increase in berry-producing shrubs.

In the long-term, mature forest character is expected to be reached sooner than would be expected without thinning or under a timber thinning prescription.

The increased habitat capability for deer and other wildlife from thinning of second growth stands is not reflected in the following analyses. While it has been shown that forage productivity for deer can be extended for about 10 years by precommercial thinning clearcuts less than 15 years of age (Kessler, 1984), results in older-aged stands are not as clearly defined. Similarly, the time at which second growth stands would begin to demonstrate mature forest character is not certain. While the effects are expected to be positive, actual increases in habitat capability over those reflected in the following long-term analysis are not yet quantifiable.

Monitoring vegetative response would provide a basis for refinement of future second growth management techniques and a more certain evaluation of the benefits to wildlife.

Effects of Log Transfer Facilities

There are two types of potential effects associated with a log transfer facility (LTF) and camp. First is the potential loss of wildlife habitat due to clearing for the camp, sort yard, and associated facilities. Second, and most important, is the disturbance to deer and other wildlife as a result of increased human activity associated with the camp.

The amount of direct habitat loss as a result of log transfer facility development is relatively minor. Less than 20 acres of upland would be altered for the proposed LTF in Alternatives 2 and 3. Under Alternatives 4, 5, 6 and 7 LTF development would occur on private lands in MacLeod harbor at a previously used site.

The overall disturbance of wildlife use patterns from the LTF site is expected to be minor, as wildlife species generally adapt to localized increased human use relatively quickly. The greatest effect on wildlife results from the human activity associated with the camps and facilities. This includes disturbance of wildlife use patterns, increased harvest, and increased bear-human encounters. The effect of increased human activity under each alternative is discussed in the following sections for individual MIS.

Black-Tailed Deer Model

The Forest Service and Alaska Department of Fish and Game biologists have jointly developed a habitat capability model (Barber, et al., 1989) to predict the effects of timber harvest on deer. The Sitka black-tailed deer model from Southeast Alaska (Suring, et al., 1988a) was used as a basis but modified to fit the conditions in Prince William Sound. The model, assisted by a computerized geographic information system, provides site-specific information to predict impacts. The model uses aspect, vegetation type, timber volume class, relative snow depth and climate as predictors of habitat suitability. Mid- and high-volume mature productive forest stands on south

aspects at low elevations in areas of relatively low snow depths provide the best winter habitat conditions (Map 4).

Predation is not considered to be a significant factor affecting deer populations on Montague Island. Brown bears are the only natural predators and are in hibernation during most of the critical months.

Winter habitat capability is displayed as effective acres. Effective acres for each vegetation stand is calculated by multiplying the acres times a coefficient which evaluates the snow interception and forage production qualities of the stands with respect to its elevation and aspect for a given winter severity category. The effective acres for a 50 acre mid-volume Sitka spruce stand on a south aspect at low elevation for a deep snow winter would be calculated as follows: 50 x 0.3 = 15. The same stand during a low snow winter is estimated to provide 50 effective acres. A 50-acre Sitka spruce stand on a north aspect at a high elevation during a deep snow winter is presumed to provide 0 effective acres. The total effective acres for a given winter severity scenario are the summation of the effective acres of each stand within the defined area.

Estimates from Southeast winter deer numbers are approximately 125 deer per 640 effective acres. Deer densities for the Big Islands Management Area are not available, however, they are likely lower than estimates for Southeast Alaska because of harsher winter conditions.

Given the relationship between habitat capability and populations discussed previously, it can generally be inferred that a reduction in habitat capability (effective acres) displayed in the model would result in a similar trend in population numbers. Actual population sizes in small areas will fluctuate considerably from those inferred from the model.

The existing effective acres in 1989 for the various winter severity scenarios is displayed in Figure 4-1. Approximately 65, 67, 77 and 70 percent of the deep, moderate, low and mean snow winter deer habitat capability on Montague Island comes from national forest lands. State selected lands provide only one percent of the habitat capability under all snow scenarios, with the remaining provided by private lands.

The frequency of each of the three snowfall winters was estimated through examination of the weather records since 1909 at various locations throughout Prince William Sound. Information was incomplete and records from various locations were often combined. Deep, moderate and low snow winters are assumed to occur approximately 15, 70 and 15 percent of the time, respectively. Yearly variation in winter severity (mean winter) was calculated by weighting each snowfall category by its expected frequency of occurrence.

In a general sense, it is assumed that during a deep snow year most deer are forced to the low elevation beach fringe stands and movement between stands is generally precluded by snow depths. In a moderate snow year, stands with adequate snow interception capability and forage at mid-elevations also provide winter habitat, but snow depths minimize movement between stands. Forage in all forested habitats are available to deer in various degrees during low snow winters with snow depths at low-to mid-elevations generally not restricting movements between stands.

Short-term Effects of Timber Harvest

Short-term impacts of proposed timber harvest on National Forest lands for the period 1989-1999 are estimated for four snowfall scenarios in Figure 4-2. Habitat capability for National Forest lands on Montague Island as a whole would be unchanged from timber harvest under Alternatives 1 and 7 and reduced between 2 and 4 percent for all winter severities for Alternatives 2 through 6. On south Montague (Game Management Unit 6, subunits 35, 36 and 37, see Map 4) deep and moderate snow winter habitat capability would be reduced by 3 percent for Alternative 2, six percent for Alternative 3, 7 percent for Alternative 4 and 9 percent for Alternatives 5 and 6 (Maps 5, 7, 9, 11 and 13). Low snow winter capability on south Montague would be reduced between 1 and 3 percent and mean habitat capability would be reduced between 3 and 6 percent. The effect of timber harvest is most pronounced during a deep snow winter when deer need as much mature forest canopy as possible. During low snow winters, a snow intercepting canopy is less important.

Alternatives 2 and 3 concentrate harvest in Game Management Unit 6, subunit 35. Alternative 4 proposes harvest in subunits 35 and 36, whereas Alternatives 5 and 6 propose harvest in all three subunits on national forest lands on south Montague Island. Subunit 35 deep snow winter habitat capability is reduced by 9, 19, 11, 13 and 13 percent under Alternatives 2, 3, 4, 5 and 6, respectively. Subunit 36 deep snow habitat capability is reduced by approximately 13 percent under Alternatives 4, 5 and 6. Reductions to subunit 37 deep snow winter habitat capability are only two and four percent for Alternatives 5 and 6, respectively.

Current deer populations on Montague Island are considered to be high as no deep snow winters have reduced populations since the early 1970's. All alternatives would maintain enough habitat to support current deer populations under a low snow winter. A deep snow winter, even under Alternatives 1 and 7, would probably significantly reduce deer populations on Montague Island. Deer numbers would be further reduced in subunits 35 and 36 proportional to the reduction in deep snow winter habitat capability for each alternative. Alternatives 5 and 6 would probably not significantly reduce numbers in subunit 37 above that expected from a deep snow winter under Alternatives 1 and 7. However, overall impacts to deer winter habitat capability on south Montague are greatest under Alternatives 5 and 6. Alternative 2 has the least effect of Alternatives 2 through 6 and limits effects to Game Management Unit 6 subunit 35.

The level of impact from any of the timber harvest alternatives is probably insignificant, by itself, to the overall winter habitat capability for deer on Montague Island.

Figure 4-1 Effective acres of 1989 winter deer habitat, under varying snow severities, on Montague Island, by landowner.

Affected Area	Winter Severity Category	National Forest Acres	%	State Selected Acres	%	Private Acres	%	Total acres on all Ownerships
Montague Island	Deep	3,794	65	72	1	1,962	34	5,828
	Moderate	6,968	67	94	1	3,397	32	10,459
	Low	21,464	77	290	1	6,015	22	27,769
	Mean	8,666	70	120	1	3,575	29	12,361
south Montague*	Deep	1,766	47	0	0	1,962	53	3,728
	Moderate	3,332	50	0	0	3,397	50	6,729
	Low	10,294	63	0	0	6,015	37	16,309
	Mean	4,141	54	0	0	3,575	46	7,716

* Includes ADF&G Game Management Unit 6, subunits 35, 36, and 37. See Map 4.

Figure 4-2 Percent of 1989 winter deer habitat capability under varying snow severities, remaining after proposed harvest on national forest lands on Montague Island, by alternative.

Affected Area	Winter Severity	Effective Acres in 1947 **	Effective Acres in 1989 **	% of 1989 Effective Acres in 1999 Alternative ** 1	2	3	4	5	6	7
Montague Island	Deep	4,165	3,794	100	98	97	97	96	96	100
	Moderate	7,711	6,698	100	98	97	96	96	96	100
	Low	22,513	21,464	100	99	99	99	99	98	100
	Mean	9,399	8,666	100	99	98	97	97	97	100
south Montague*	Deep	1,939	1,766	100	97	94	93	91	91	100
	Moderate	3,678	3,332	100	97	94	93	91	91	100
	Low	10,767	10,294	100	99	98	97	97	97	100
	Mean	4,481	4,141	100	97	95	94	93	94	100

* Includes ADF&G Game Management Unit 6, subunits 35, 36, and 37. See Map 4.
** Includes effective acres on national forest admininstered lands only.

Cumulative Effects of Forest Service and Private Timber Harvest

The combined effects of timber harvest activities on deer winter habitat capability on all ownerships on Montague Island is displayed in Figure 4-3. Habitat capability on Montague Island for mean snow winters would be reduced by 18 to 20 percent under Alternatives 1 through 7. Habitat capability on south Montague Island would be reduced from 43 to 39 percent for a deep snow winter, 33 to 38 percent for a moderate snow winter, 18 to 16 percent for a low snow winter and 32 to 28 percent for a mean snow winter. Reduction of habitat capability for Alternatives 1 and 7 is a result of actions on private land only.

Impacts from private harvest are limited to subunits 35 and 37. Cumulative effects of Forest Service and private actions would reduce the deep winter habitat capability from 20 to 28 percent in subunit 35 and from 54 to 55 percent in subunit 37.

The level of harvest proposed on national forest and private lands, under all alternatives, would likely significantly reduce the deer winter habitat capability on south Montague Island under all snow scenarios, with the possible exception of a low snow winter. Potential effects are most significant in subunit 37, and are mostly a result of private actions. Private lands in subunit 37 contribute approximately 32, 31, 20 and 27 percent of existing deep, moderate, low and mean habitat capability, respectively, on Montague Island.

The effects of this expected reduction in habitat capability on deer hunting is discussed in the section on hunting and trapping.

Long-Term Effects

In the long-term, timber harvest converts mature forest stands into even-aged, closed canopy stands. The closed canopy intercepts snow well and provides thermal cover, but preferred browse species are eliminated and therefore, habitat capability is reduced.

This analysis attempts to predict the long-term cumulative effects of timber harvest on deer habitat capability and populations from previous, proposed, current and potential future harvest to the end of the rotation on all lands, regardless of ownership, on Montague Island.

The analysis assumes:

1.All timber on national forest Lands currently classified as suitable, and not under a wildlife retention prescription, would be harvested by the end of the rotation.

2. All timber stands harvested between 1947-1973 were high volume stands prior to 1947.

3. No timber would be harvested on state-selected lands during the life of the rotation.

4. All commercially available timber on private lands would be harvested by 1999 and in second growth throughout the remainder of the rotation.

From 1947 to 1989 habitat capability on Montague Island declined by 9, 10, 5 and 8 percent for deep, moderate, low and mean snow scenarios, respectively. Habitat

capability reductions were similar when viewed for south Montague Island only (Figure 4-4). Reductions were mainly a result of Forest Service timber harvest activities between 1947 and 1973.

Past harvest activities were concentrated in Game Management 6, subunits 34 and 35. Subunit 35 habitat capability was reduced by 22, 22, 10 and 18 percent for deep, moderate, low and mean snow winters, respectively. Habitat capability in subunits 36 and 37 was not affected.

Past harvest combined with effects of harvest on private lands and the projected potential harvest on national forest lands to the end of the rotation is projected to reduce the deep, moderate, low and mean habitat capability on Montague Island by 40, 47, 40 and 44 percent, respectively. Approximately 50 percent of this projected reduction is due to actions on private lands during the current planning period. Second growth management techniques on national forest lands may provide limited opportunities to reduce the potential long-term effects.

Effects of Roads and Humans

Roads and trails proposed under Alternatives 2 through 6 would increase access to deer habitats and increase opportunities to harvest deer (Maps 5, 7, 9, 11 and 13). Hunting and other human use is expected to increase under Alternatives 2 through 6, especially Alternative 5. The proposed road under Alternative 7 (Map 15) would be closed to public use and little increase in harvest is anticipated. Hunting has not been shown to be detrimental to Prince William Sound deer populations. Harvest of deer would help to contain the population in balance with the available habitat. The major past impact to winter range habitat in Prince William Sound has been a result of over-utilization of winter range by the deer themselves (ADF&G, 1976).

Extensive vehicle use of roads during critical winter and spring periods in areas where deer are concentrated may result in deaths from road kills and stress-related factors. The most likely source of impact would be from winter hauling of timber. However, management area-wide standards and guidelines (Appendix F) provide for closure of these roads in winter should impacts appear to be significant.

Roading on private lands would likely provide additional access to deer habitats. Roads associated with potential future harvest activities on Forest Service lands would further increase human access to deer habitats and opportunities to harvest deer in the long-term. Increased harvest may result in more restrictive harvest regulations by the ADF&G. See section on hunting and trapping.

Figure 4-3 Percent of 1989 winter deer habitat capability, under varying snow severities, remaining after proposed national forest and private harvest on Montague Island, by alternative.

Affected Area	Winter Severity	Effective Acres in 1947 **	Effective Acres in 1989 **	% of 1989 Effective Acres in 1999 Alternative **						
				1	2	3	4	5	6	7
Montague Island	Deep	6,280	5,828	75	74	73	73	72	72	75
	Moderate	11,363	10,459	79	77	77	76	76	76	79
	Low	29,307	27,769	90	90	90	89	89	89	90
	Mean	13,251	12,361	82	81	81	80	80	80	82
south Montague*	Deep	3,982	3,728	61	60	58	58	57	57	61
	Moderate	7,236	6,729	67	65	64	63	63	62	67
	Low	17,001	16,309	84	83	82	82	82	82	84
	Mean	8,213	7,716	72	70	69	69	68	68	72

* Includes ADF&G Game Management Unit 6, subunits 35, 36, and 37. See Map 4.
** Includes effective acres on national forest, state selected and private lands.

Figure 4-4 Effective acres of winter deer habitat, under varying severities, on all ownerships in 1947, 1989 and at the end of the rotation on Montague Island.

Affected Area	Winter Severity	Acres in 1947	Acres and (%) of 1947 acres in 1989	Acres and (%) of 1947 Acres at End of Rotation
Montague Island	Deep	6,280	5,828 (93)	3,759 (60)
	Moderate	11,363	10,459 (92)	6,054 (53)
	Low	29,037	27,769 (96)	17,292 (60)
	Mean	13,251	12,361 (93)	7,395 (56)
south Montague*	Deep	3,982	3,728 (94)	2,159 (54)
	Moderate	7,236	6,729 (93)	3,408 (47)
	Low	17,001	16,309 (96)	10,818 (64)
	Mean	8,213	7,717 (93)	4,332 (53)

* Includes ADF&G Game Management Unit 6, subunits 35, 36, and 37. See Map 4.

Brown Bear

General Effects of Timber Harvest

Although brown bear make use of most all available habitats on Montague Island, only forested habitats are proposed for modification. For purposes of analysis of the effects of timber harvest, brown bear habitat is stratified into two categories: 1) riparian/beach fringe forests; and 2) upland forests. Riparian forests are defined as productive forest lands (PFL) or unproductive forests within 100 feet of streams or lakes and adjacent land types that potentially contain unmapped anadromous fish habitat (Stream Habitat Zones, Appendix E and Map 19). Beach fringe forests are defined as both the PFL and unproductive forests within 500 feet of the coastline (prior to the 1964 earthquake). Upland forest includes both PFL and unproductive forest types not included in the beach fringe or riparian classifications. Of the two habitat types, the amount and quality of the riparian/beach fringe habitat is probably the better indicator of overall habitat quality.

Clearcutting within upland forests can potentially create highly productive foraging sites for bears for about 25 years following timber harvest depending on the species mix of the understory. Habitat capability is probably maintained or enhanced during this period; however, information is unavailable on brown bear use of clearcut habitats in Prince William Sound. A study in Southeast Alaska (Schoen and Beier, 1988) suggests that brown bear make little use of clearcut areas on Chichagof Island; however, results are inconclusive and may not be applicable to the situation in the Big Islands Management Area.

After 25 years, forage production and habitat capability declines as the conifer canopy closes. Clearcutting in riparian and beach fringe forests removes security cover adjacent to important salmon streams and beach foraging areas, thereby potentially reducing habitat capability. Second growth forests provide some cover but lack the diversity and abundance of forage associated with mature stands.

There are 18,766 acres of riparian/beach fringe habitat and 83,551 acres of upland habitat on Montague Island. Twelve percent of the riparian/beach fringe and 1 percent of the upland forests are currently in second growth (Figures 4-5 and 4-6).

Figure 4-5 Acres of Management Indicator Species habitat on Montague Island.

MIS	Total habitat **			Unproductive Forest			Second Growth			Mature PFL		
Habitat	FS	Other	Total	FS	Other	Total	FS	Other	Total	FS	Other	Total
Brown Bear Rip/Beach Fringe	13,660	5,106	18,766	5,360	1,648	7,008	2,019	262	2,281	6,281	3,196	9,477
Brown Bear Upland	75,431	8,120	83,551	59,587	5,013	64,600	690	48	738	15,174	3,059	18,233
Bald Eagle	5,406	983	6,389	2,519	632	3,151	240	103	343	2,647	248	2,895
PWS Canada Goose	38,190	3,029	41,219	30,492	2,121	32,613	546	8	554	7,152	900	8,052
Woodpeckers	89,091	13,226	102,317	64,947	6,661	71,608	2,699	310	3,009	21,465	6,255	27,720
Common Merganser	8,254	4,123	12,377	2,841	1,016	3,857	1,779	159	1,938	3,634	2,948	6,582

** Includes mature productive forest (PFL), second growth and unproductive forest on national forest land (FS), state selected and private land (Other) and total for all ownerships (Total).

Figure 4-6 Acres of Management Indicator Species habitat on south Montague Island.*

MIS	Total habitat **			Unproductive Forest			Second Growth			Mature PFL		
Habitat	FS	Other	Total	FS	Other	Total	FS	Other	Total	FS	Other	Total
Brown Bear Rip/Beach Fringe	5,419	4,618	10,037	2,031	1,222	3,253	781	262	1,043	2,607	3,134	5,741
Brown Bear Upland	37,645	7,524	45,169	29,153	4,467	33,620	272	48	320	8,220	3,009	11,229
Bald Eagle	1,531	600	2,131	820	285	1,105	96	103	199	615	212	827
PWS Canada Goose	14,391	2,158	16,549	11,496	1,295	12,791	122	8	130	2,773	855	3,628
Woodpeckers	43,064	12,142	55,206	31,184	5,689	36,873	1,053	310	1,363	10,827	6,143	16,970
Common Merganser	3,888	4,018	7,906	1,211	937	2,148	685	159	844	1,992	2,922	4,914

* Includes ADF&G Game Management Unit 6, subunits 35, 36 and 37. See Map 4.

** Includes mature productive forest (PFL), second growth and unproductive forest on national forest land (FS), state selected and private land (Other) and total for all ownerships (Total).

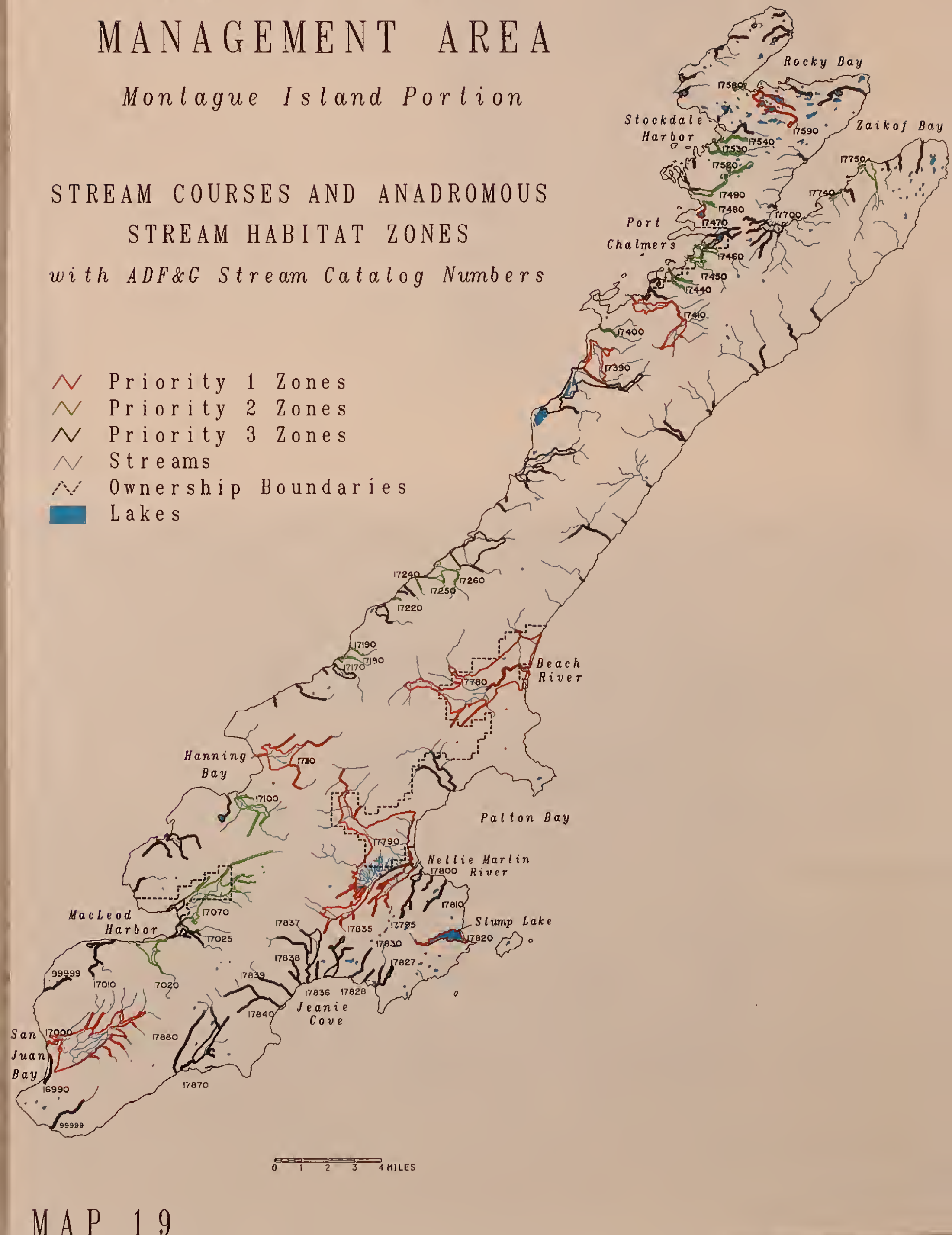
CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

STREAM COURSES AND ANADROMOUS STREAM HABITAT ZONES

with ADF&G Stream Catalog Numbers



MAP 19

Short-Term Effects of Timber Harvest

Alternatives 2 through 6 would convert between 2 percent (110 acres) and 7 percent (415 acres) of the mature PFL riparian/beach fringe habitats and between 4 percent (667 acres) and 5 percent (819 acres) of the mature PFL upland habitats on national forest lands on Montague Island into second growth. Between 4 and 16 percent of riparian/beach fringe and 8 to 10 percent of upland PFL would be converted to second growth on national forest lands in Game Management subunits 35, 36 and 37 (south Montague Island, Figure 4-7).

While some timber would be harvested in the riparian/beach fringe habitat, much of the riparian/beach fringe habitat estimated to be harvested would be retained by application of the standards and guidelines for streamside harvest and eagle habitat maintenance (Appendices F and H). These acres would provide security cover for bears fishing along streams and foraging in beach fringe areas. Timber harvest in upland forests may increase forage production especially in the higher volume stands. Thus, the short-term effects of timber harvest under Alternatives 2 through 6 is expected to at least maintain bear habitat capability on National Forest lands. The effects of associated roads and increased human use is discussed in following sections.

Cumulative Effects of Forest Service and Private Timber Harvest

Brown bear use all available habitats on Montague Island regardless of ownership. The effects of timber harvest on the bear populations on Montague Island are not limited to Forest Service activities. The combined percent of Forest Service harvest by alternative and private harvest is displayed in Figure 4-8. Large clearcuts with poor juxtaposition of security cover and forage and expected removal of much of the security cover along important salmon streams on private lands will likely reduce the short-term habitat capability for brown bears on private lands on south Montague.

Figure 4-7 National forest PFL, productive forest lands, brown bear habitat proposed for harvest on Montague Island, by alternative.

Habitat	Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999											
			1		2		3		4		5		6		7	
			Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	Riparian/ Beach Fringe	6,281	0	0	110	2	217	3	242	4	415	7	400	6	0	0
	Upland	15,174	0	0	667	4	797	5	757	5	736	5	819	5	0	0
south Montague	Riparian/ Beach Fringe	2,607	0	0	110	4	217	8	242	9	415	16	400	15	0	0
	Upland	8,220	0	0	667	8	797	10	757	9	736	9	819	10	0	0

Figure 4-8 All ownership PFL, productive forest lands, brown bear habitat proposed for harvest on Montague Island, by alternative.

Habitat	Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999											
			1		2		3		4		5		6		7	
			Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	Riparian/ Beach Fringe	9,477	3,006	32	3,116	33	3,223	34	3,248	34	3,421	36	3,406	36	3,006	32
	Upland	18,233	2,450	13	3,117	17	3,246	18	3,207	18	3,186	17	3,269	18	2,450	13
south Montague	Riparian/ Beach Fringe	5,741	3,006	52	3,116	54	3,223	56	3,254	57	3,421	60	3,406	60	3,006	52
	Upland	11,229	2,450	22	3,117	28	3,246	29	3,207	29	3,186	28	3,269	29	2,450	22

Long-Term Effects of Timber Harvest

By the end of the rotation, 82 percent of the riparian/beach fringe PFL and 54 percent of the upland PFL habitats on Montague Island would be in second growth assuming that all timber on national forest lands currently classified as suitable is harvested (Figure 4-9). Eighty percent of the riparian/beach fringe PFL, and 58 percent of the upland PFL, bear habitats would be in second growth on south Montague Island assuming that all timber currently classified as suitable on national forest lands is harvested by the end of the rotation (Figure 4-10). The effects of this level of harvest on bear habitat capability depends largely upon timing, spacing, placement, and size of timber harvest units. Bear habitat capability on national forest lands, as influenced by removal of mature forests, would likely be maintained to the end of the rotation, if the future harvest is planned to: 1) provide a continual supply of recent clearcuts throughout time, 2) minimize the amount of bear habitat in unproductive older second growth stands at any time, and 3) intersperse the second growth stands with stands of mature forest to provide security cover adjacent to important riparian and beach fringe foraging areas. Management area-wide standards and guidelines for timber harvest in riparian areas and measures for protection and maintenance of eagle habitat (Appendices F and H) would greatly reduce the actual harvest in the riparian/beach fringe habitats. Unproductive upland and riparian/beach fringe forest lands would provide additional habitat capability (Figures 4-5 and 4-6) throughout the rotation.

Concentrated harvest under Alternative 3 would reduce the opportunity to maintain a good mix of second growth stands, recent clearcuts and mature forest over time in Game Management 6, subunit 35. Similarly, private harvest of large areas is expected to reduce the long-term habitat capability for brown bears in subunit 37. The major known brown bear concentration areas on south Montague Island are in subunit 37 (Map 4).

Long-term effects to bear habitat capability from proposed roading and increased human use are discussed below.

Figure 4-9 Potential Long Term Effects on Habitat on Montague Island

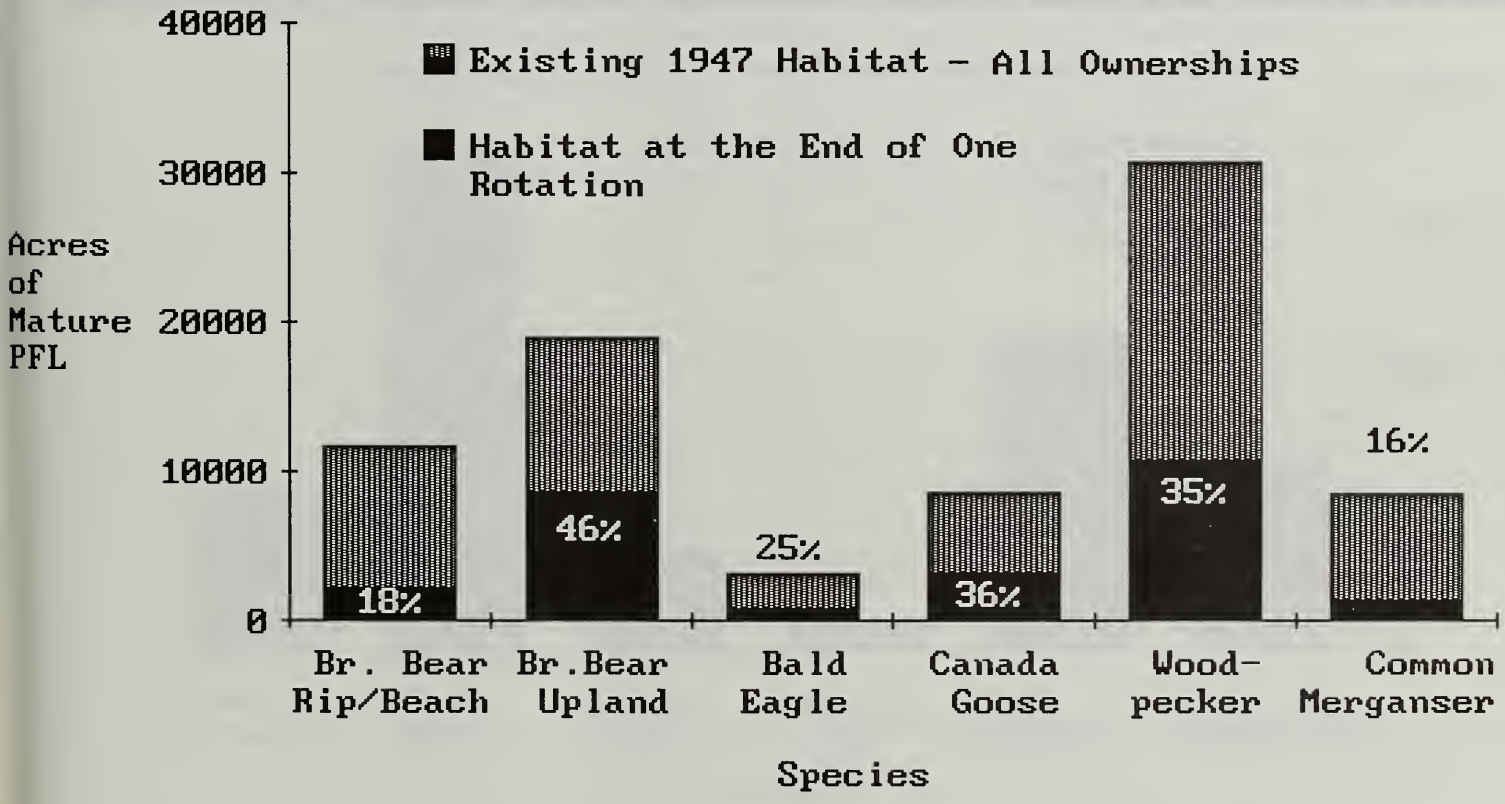
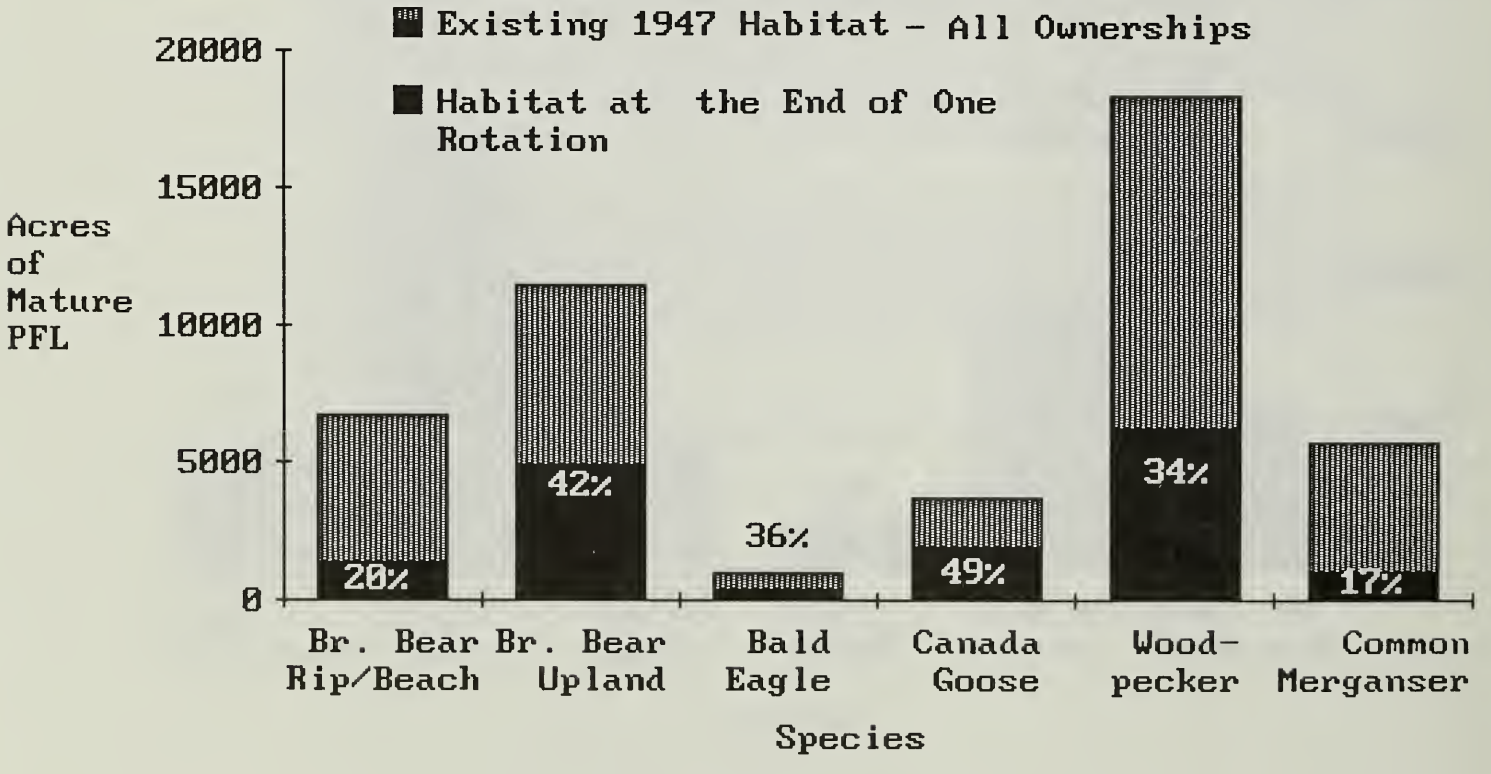


Figure 4-10 Potential Long Term Effects on Habitat on south Montague



Effects of Roads and Humans

The construction of roads and trails and increased human activity would increase opportunities and demand to harvest brown bears. Increased human activity and access would increase bear mortality due to legal harvest, illegal harvest, bears killed in defense of life and property and removal of nuisance bears. The increased harvest may depress bear populations.

Road and trail construction associated with Alternatives 2 through 6 would increase hunting and recreation access to brown bear habitats (Maps 5, 7, 9, 11 and 13). Hunter harvest would increase under each alternative. Bears killed in defense of life and property would likely increase under each alternative. Roads located on the uplifted beach with each alternative and associated disturbance may reduce the opportunities for use of these areas by foraging bears. The effects on brown bear habitat movements from increased roading on Chichagof Island were relatively insignificant. Schoen and Beier (1988) reported that bears moved their day beds away from active development, but generally remained in the same areas within several hundred meters of the development activity. Although bears shifted their activities away from roads during the day, they moved in closer to the road when activity ceased during evening hours. Roads proposed on beaches in this document are not expected to significantly affect the movements of brown bears on Montague Island. Beach roads are not located in any known bear concentration areas (Map 4). If bears are displaced from beach areas during the day, it is possible they will take advantage of any available foraging opportunities during evening hours.

Campgrounds, logging camps and garbage facilities associated with each alternative have the potential to increase bear/human conflicts with a subsequent increase in bear mortality. The increases in human disturbance, access and bear mortalities would be greatest under those alternatives with the most extensive road and trail building and camping facilities. Alternative 5 proposes the largest amount of roads and trails and other facilities followed by Alternatives 6 and 4, and then Alternatives 3 and 2. Alternative 7 proposes similar miles of road construction as Alternatives 2 and 3, but with no recreation or trail development. Impacts to brown bear under Alternative 7 would be limited to effects from logging traffic on the proposed road and associated increase in mortality from bear/human conflicts.

It is unknown to what degree roads on private lands will be used during and after timber harvest activities to provide access for human use and hunting. However, it is likely that bear/human conflicts and subsequent mortalities would increase on private lands as well. The major known bear concentration areas on south Montague Island are located mostly on private lands in the Patton Bay area (Map 4).

Potential future management activities may result in additional roads on national forest lands on Montague Island to access the remaining suitable timber. Any future road development would increase the potential for impacts to brown bears from increased human presence on Montague Island.

The level of impacts on national forest lands would be reduced through the application of the management area-wide standards and guidelines (Appendix F). They provide for seasonal closure of roads and trails as necessary, bear-proof garbage facilites at logging camps and the implementation of a "Pack it In, Pack it Out" program at overnight recreation sites to reduce the levels of human/bear encounters. Bear-proof food caches would be installed at all recreation cabins. Schoen and Beier (1988) reported

a lack of bear problems in a road construction camp due to the camp's rigid garbage policy. From 40 to 60 people were involved in construction of the road in an area of relatively high bear density.

It is likely that more restrictive harvest regulations would be imposed by the Alaska Department of Fish and Game (Schoen and Beier, 1987). See discussion of effects on brown bear hunting.

Bald Eagle

General Effects of Timber Harvest

The majority of bald eagles in the Big Islands Management Area nest in coniferous forests within 500 feet of the coastline. Bald eagle habitat for this analysis is defined as forested habitat within 500 feet of the coastline (prior to the 1964 earthquake). Productive forest land (PFL) generally provides nesting sites suitable for bald eagles, however, unproductive forest stands provide some opportunities (Suring, et al., 1988b).

Bald eagles prefer large diameter mature trees for nest and perch sites. Typical nest trees are at least 400 to 500 years old. Removal of perch or nest trees reduces habitat capability. Hodges (1982) estimated that every 13 years 50 percent of eagle nests are lost to wind-related events. Therefore, long-term management of eagle habitat requires that alternate nest and perch sites be retained (Suring, et al., 1988b).

There are 6,389 acres of eagle habitat on Montague Island, of which five percent is currently in second growth (Figures 4-5 and 4-6). There are 67 known eagle nests on Montague Island (Map 4).

Short-Term Effects of Timber Harvest

Alternatives 2 through 6 propose to harvest between 1 percent (10 acres) to 2 percent (56 acres) of the mature PFL eagle habitat on national forest lands on Montague Island (Figure 4-11). Alternatives 2 and 3 propose harvest in the vicinity of a single eagle nest. This harvest unit would have the boundaries adjusted to conform to standards and guidelines for maintaining the 330-foot windfirm zone around eagle nest trees. No harvest is proposed near eagle nests in the other alternatives (Figure 4-12). With established protection for existing nest trees and standards and guidelines for maintaining alternate nest and perch trees (Appendix F), harvest proposed for any alternative would be unlikely to have any impact on existing eagle populations. Mitigation measures for individual harvest units are displayed in Appendix H.

Under various roading options proposed by alternatives there are between 3 and 7 nests within one half mile of proposed roads (Figure 4-12). These nests would be vulnerable to human disturbance from road construction activities and traffic.

Cumulative Effects of Forest Service and Private Timber Harvest

Combined percent harvest of mature PFL eagle habitat on Montague Island from both Forest Service and private corporation actions is between 6 and 9 percent (Figure 4-13). There are 13 known eagle nests on private lands on Montague Island (Map 4). Six of these nests are adjacent to probable harvest areas and nine nests are within one half mile of proposed roads (Figure 4-14). The level of presumed private harvest, especially if windfirm buffers are not established around existing eagle nests, could sig-

nificantly reduce the habitat capability for eagles on private lands. The overall reduction to eagle nesting habitat capability to south Montague on national forest and private lands would be between 23 and 30 percent (Figure 4-13).

Long-Term Effects of Timber Harvest

By the end of the rotation, 75 percent of the PFL in bald eagle habitats on Montague Island, or 64 percent of the PFL on south Montague Island (Figures 4-9 and 4-10) would be in second growth, assuming harvest of all suitable national forest timber. Timber harvest would reduce the number of suitable nest and perch trees, and it is estimated that 50 percent of the nests would be lost to natural processes every 13 years. The effects of this level of harvest on eagle habitat capability depends partially on the continued maintenance of the 330-foot buffer around existing eagle nest trees, even if nests become inactive or blow down, and the availability of alternate nest and perch sites. It is unlikely that similar habitat protection measures would be considered on private lands.

Approximately 3,000 acres of unproductive forest in eagle habitats on Montague Island (Table 4-5) would provide additional nesting opportunities. Many of the known eagle nest sites are located within stands classified as unproductive forest.

Figure 4-11 National forest PFL, productive forest lands, bald eagle habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	2,647	0	0	64	2	53	2	16	1	19	1	29	1	0	0
south Montague	615	0	0	64	9	53	7	16	2	19	2	29	4	0	0

Figure 4-12 Eagle Nests potentially affected by proposed Forest Service actions on Montague Island, by alternative.

	Alternatives						
	1	2	3	4	5	6	7
Number of eagle nests*							
Montague Island	67	67	67	67	67	67	67
south Montague**	36	36	36	36	36	36	36
Number of eagle nests within 0.5 miles of roads	0	3	3	7	7	7	7
Number of eagle nests within 330 feet of harvest unit	0	1	1	0	0	0	0

* Includes 13 nests on private and 2 on state selected lands.

** ADF&G Game Management Unit 6, subunits 35, 36 and 37 (Map 4).

Figure 4-13 All ownership PFL, productive forest lands, bald eagle habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	2,895	187	6	251	9	240	8	203	7	206	7	216	7	187	6
south Montague	827	187	23	251	30	240	29	203	25	206	25	216	26	187	23

Figure 4-14 Eagle Nests potentially affected by proposed Forest Service and private actions on Montague Island, by alternative.

	Alternatives						
	1	2	3	4	5	6	7
Number of eagle nests*							
Montague Island	67	67	67	67	67	67	67
south Montague**	36	36	36	36	36	36	36
Number of eagle nests within 0.5 miles of roads	9	12	12	16	16	16	16
Number of eagle nests within 330 feet of harvest unit	6	7	7	6	6	6	6

* Includes 13 nests on private and 2 on state selected lands.

** ADF&G Game Management Unit 6, subunits 35, 36 and 37 (Map 4).

Effects of Roads and Humans

Nesting bald eagles are vulnerable to disturbance. Whether a given event is significant or not, depends on the severity of the disturbance, stage of breeding cycle and the response of the bald eagle involved. Because bald eagles vary considerably in their response to human activity, it is difficult to predict the effects of a given type of human disturbance on individual eagles (Stalmaster, et al., 1985).

The potential disturbances to bald eagles are associated with road construction, timber harvest, and recreation use including: vehicle traffic, boat traffic, low flying aircraft, firearm discharge, blasting, foot traffic and logging. Alternative 5 has the greatest potential for disturbance to nesting eagles from increased human activity, followed by Alternatives 6, 4 and 7, then Alternatives 3 and 2 (Maps 5, 7, 9, 11 and 13). Alternative 6 proposes the greatest amount of road adjacent to potential eagle habitat. The proposed road under Alternative 7 affects almost the same eagle habitat areas as Alternatives 4 and 5 (Map 15). However, human use levels, other than private corporation log truck traffic, would be less.

Potential disturbance to nesting eagles on private lands would increase the overall cumulative impacts.

Any additional roading associated with potential future harvest has the capacity to further influence nesting eagles. However, the 330-foot buffer will be established around all eagle nest trees should future harvest activities occur.

Prince William Sound Canada Goose

General Effects of Timber Harvest

Upland muskeg pond habitats and associated mature forest provide nesting and brood rearing habitat for the Prince William Sound Canada goose. Although genetic characteristics are still in question, general habitat use is similar to the Vancouver Canada Goose. Prince William Sound Goose habitat for this analysis is defined as both productive forest and unproductive forest within 2,600 feet of upland muskeg ponds (Doyle, et al., 1988).

Clearcutting in goose nesting habitat removes the overstory important in terms of nest location, roosting and loafing sites for about 25 years, while maintaining an appropriate understory in terms of food and cover (Lebeda and Ratti, 1983). Second growth stands probably provide adequate tree cover, but understories lack adequate food and low vegetative cover (Alaback, 1984).

Short-Term Effects of Timber Harvest

Prince William Sound Canada Goose habitat on Montague Island totals 41,219 acres. One percent has been converted to second growth (Figures 4-5 and 4-6). From 2 to 4 percent (130 to 280 acres) of the mature PFL within goose habitats on national forest lands on Montague Island would be harvested under Alternatives 2 through 6 (Figure 4-15). Effects from any alternative are insignificant.

Cumulative Effects of Forest Service and Private Timber Harvest

The total impact to goose habitats on Montague Island from both Forest Service and private timber harvest activities is displayed in Figure 4-16. The percent of mature PFL harvest displayed greatly exaggerates the overall impacts to goose nesting habitat from the combined effects of private actions. Few lakes are present on private lands, but most are surrounded by large areas of productive forest. It is unlikely that removal of the mature forest adjacent to these few lakes would significantly affect overall goose habitat capability on Montague Island. Most lakes on national forest lands are bordered by unproductive forests. Overall, harvest levels proposed in goose habitats are relatively low. Implementation of any alternative, coupled with proposed private harvest, should result in no measurable impact in the carrying capacity for Prince William Sound Canada geese.

Long-Term Effects of Timber Harvest

By the end of the rotation, 63 percent of the goose habitat on Montague Island, or 51 percent of the goose habitat on south Montague Island (Figures 4-9 and 4-10) would be in second growth if all the suitable timber on national forest lands is harvested. Most upland muskeg ponds are associated with unproductive forests and probably provide most of the nesting opportunites. Impacts to goose populations from proposed future harvest activities are probably much less than inferred from the loss of mature productive forest stands.

Figure 4-15 National forest PFL, productive forest lands, Prince William Sound canada goose habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	7,152	0	0	141	2	130	2	243	3	280	4	246	3	0	0
south Montague	2,773	0	0	141	5	130	5	243	9	280	10	246	9	0	0

Figure 4-16 All ownership PFL, productive forest lands, Prince William Sound canada goose habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	8,052	855	11	986	12	985	12	1,098	14	1,135	14	1,101	14	855	11
south Montague	3,628	855	24	996	27	985	27	1,098	30	1,135	31	1,101	30	855	24

Effects of Roads and Humans

Roads and trails through Prince William Sound Canada goose habitat would increase opportunities for human disturbance during nesting and migration. Roads along beach habitats during fall migration creates opportunities for hunters to harvest geese. Alternative 5 builds the largest amount of roads and trails, followed by Alternatives 6 and 4, Alternatives 3 and 2 and Alternative 7.

Woodpeckers

General Effects of Timber Harvest

Woodpeckers generally require large diameter trees in various stages of decay, which are generally associated with mature productive forest stands. Unproductive forests generally have small diameter trees, although some species prefer the more open habitats associated with unproductive forests and suitable trees are often present (Suring, et al., 1988c, 1988d). Woodpecker habitat for this analysis includes all the productive and unproductive forest stands.

Current timber harvest activities eliminates future woodpecker nesting and roosting sites and reduces future use by secondary cavity nesters. Snags retained in clearcut areas provide some nesting habitat but clearcuts generally provide few foraging opportunities in the winter because of snow or provide unsuitable microhabitats because of cold weather. Snags that develop in second growth stands are not used by cavity nesters because they are generally too small for excavation (Chadwick, et al., 1986). Remnant snags in second growth stands receive very little use by woodpeckers because of the high stem density of trees which is unsuitable for woodpeckers (Mannan, et al., 1980).

There are 102,317 acres of woodpecker habitat on Montague Island. Three percent has been converted to second growth (Figures 4-5 and 4-6).

Short-Term Effects of Timber Harvest

From 4 to 6 percent (777 to 1,219 acres) of the mature PFL woodpecker habitats on national forest lands on Montague Island would be harvested under Alternatives 2 through 6 (Figure 4-17). Snag densities decline heavily following timber harvest. Woodpecker densities are likely to decline proportionally to the decrease in snag densities under each alternative. However, management area-wide standards and guidelines for snag retention will reduce effects (see Appendices F and H). Impacts from any action alternative to woodpecker populations are expected to be insignificant.

Cumulative Effects of Forest Service and Private Timber Harvest

From 20 to 24 percent of the mature PFL woodpecker habitat on Montague Island and 32 to 40 percent on south Montague Island would be harvested as a result of both Forest Service and private proposed actions (Figure 4-18). It is unknown whether snags would be left in harvested areas on private lands.

Long-Term Effects of Timber Harvest

Sixty-five percent of the PFL in woodpecker habitats on Montague Island, or 64 percent of the PFL in woodpecker habitat on south Montague Island, would be in second

growth by the end of the rotation if all the suitable timber on national forest lands is harvested (Figures 4-9 and 4-10). Implementation of any alternative, in association with extensive private harvest, would result in the long-term reduction in habitat capability for woodpeckers on Montague Island. Current populations appear to be well below what is expected based on habitat capability.

Effects of Roads and Humans

The effect of roads and trails on woodpecker habitat should be insignificant. Firewood cutting near cabins and campsites may reduce available snags, especially under Alternative 5. However, roads and trails would provide increased opportunities to observe woodpeckers and other cavity nesters, except under Alternative 7.

Figure 4-17 National forest PFL, productive forest lands, woodpecker habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	21,465	0	0	777	4	1014	5	999	5	1151	5	1219	6	0	0
south Montague	10,827	0	0	777	7	1014	9	999	9	1151	11	1219	11	0	0

Figure 4-18 All ownerships PFL, productive forest lands, woodpecker habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	27,720	5,486	20	6,263	23	6,500	23	6,485	23	6,637	24	6,705	24	5,486	20
south Montague	16,970	5,486	32	6,263	37	6,500	38	6,485	38	6,637	39	6,705	40	5,486	32

Common Mergansers

General Effects of Timber Harvest

Common merganser habitat for this analysis is defined as the productive forest and unproductive forest in stream habitat zones (Map 19). These zones, as defined in Appendix E, contain all forested habitat within 100 feet of anadromous fish streams and include forested land types that potentially contain coho rearing habitat. Availability of juvenile salmon coupled with large trees that provide nesting cavities are important components of nesting and brood rearing habitat (Wood, 1986).

Clearcutting in riparian areas eliminates large trees with cavities needed for nesting and may reduce the salmon rearing capability of the streams. New snags in second growth stands provide few available cavities.

There are 12,377 acres of common merganser habitat on Montague Island. Sixteen percent is currently in second growth. (Figures 4-5 and 4-6).

Short-Term Effects of Timber Harvest

From one to eleven percent (54 to 400 acres) of the mature PFL in common merganser habitats on national forest lands on Montague Island would be harvested under Alternatives 2 through 6. Localized effects would result in the potential harvest of 3 to 20 percent of the PFL common merganser habitats on south Montague Island (Figure 4-19). Alternatives 5 and 6 propose significantly more harvest in riparian areas than the other alternatives. However, much of the PFL estimated for harvest would be retained due to management area-wide standards and guidelines for timber harvest in riparian areas (Appendices F and H). Merganser habitat capability is expected to decline by the proportion of riparian habitat actually altered. Maximum harvest in riparian areas is not expected to reach 5 percent of the total common merganser habitat on Montague Island under any alternative.

Cumulative Effects of Forest Service and Private Timber Harvest

Extensive harvest in common merganser habitats on private lands is expected to reduce the local habitat capability (Figure 4-20). From 43 to 49 percent of the common merganser habitat on the Island is scheduled for harvest.

Figure 4-19 National forest PFL, productive forest lands, common merganser habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	3634	0	0	54	1	173	5	232	6	400	11	375	10	54	1
south Montague	1992	0	0	54	3	173	9	232	12	400	20	375	19	54	2

Figure 4-20 All ownerships PFL, productive forest lands, common merganser habitat proposed for harvest on Montague Island, by alternative.

Affected Area	Mature PFL in 1989	Mature PFL Harvest 1989-1999													
		1		2		3		4		5		6		7	
		Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%	Ac.	%
Montague Island	6,582	2,819	43	2,873	44	2,992	45	3,051	46	3,219	49	3,194	49	2,819	43
south Montague	4,914	2,819	57	2,873	58	2,992	61	3,057	62	3,219	66	3,194	65	2,819	57

Long-Term Effects of Timber Harvest

All alternatives, with the inclusion of the proposed private actions, would result in 84 percent of the PFL in common merganser habitat on Montague Island, or 83 percent for south Montague, converted to second growth by the end of the rotation (Figures 4-9 and 4-10). Forest Service management area-wide standards and guidelines for timber harvest in streamside areas and snag retention in riparian areas that are harvested would combine to significantly reduce estimated effects. Approximately 3,900 acres of unproductive forest in riparian areas would provide limited additional habitat capability (Figure 4-5). However, in a worst-case scenario, common merganser habitat is expected to decline proportionally to the actual reduction in the availability of mature productive forests in riparian areas.

Effects of Roads and Humans

No effect is expected from roads and trails on merganser habitats. Few roads are located in riparian areas. Trails in stream-side areas are limited. There is no information to suggest that human activity along trails or fishing streams would significantly affect merganser nesting or brood rearing.

Hunting and Trapping

Short-Term Effects on Deer Hunting

The effect of the proposed activities on deer hunting is a combination of the potential reduction in habitat capability and populations as a result of timber harvest and increased access and opportunities to harvest deer provided by roads and trails under each alternative.

Currently, most hunters probably do not hunt more than one mile from the beach. Proposed road and trail construction would increase access to deer habitats and opportunites to harvest deer. Hunter success and overall harvest would likely increase over current levels under all action alternatives in the short-term. Those alternatives with the greatest amount of road and trail building and camping facilities would allow for the greatest increase. Access- and camping-related facilities are greatest under Alternative 5, followed by Alternatives 6, 4, 3 and 2. The proposed road under Alternative 7 would not provide for increased public hunting access.

Forest Service timber harvest activities are not expected to significantly reduce habitat capability or populations on Forest Service administered lands on south Montague Island under Alternatives 2 through 6 (Figure 4-2). Any actual reductions in populations as a result of timber harvest would probably not be reflected in short-term deer harvest levels, due to increased access and opportunities to harvest deer. Reynolds (1979) noted that "except in extreme cases, hunting has little effect upon the status of Prince William Sound deer populations. Winter snow depth and duration are the controlling factors."

Responses to the 1988 deer hunter survey (Griese and Becker, 1988) indicated that the most desirable characteristic desired by hunters in Unit 6 was deer abundance. Greater access from roads and trails, in effect, increases deer abundance and opportunities to harvest deer. The least desirable characteristic documented in the survey was the presence of clearcuts and road access. The relatively primitive hunting experience currently available on south Montague Island would be modified by proposed

timber harvest and roading. Alternatives 2 and 3 would modify this experience in subunit 35 only. Alternatives 4, 5, 6 and, to a lesser degree, Alternative 7, would affect the primitive hunting experience in all three subunits on south Montague Island.

Cumulative Effects on Deer Hunting

The cumulative effects of Forest Service and private timber harvest activities would significantly reduce deer populations in Game Management Unit 6, subunit 37 (Figure 4-3, Map 4). Deep and mean snow winter habitat capability would be reduced approximately 55 and 42 percent, respectively, and are almost exclusively a result of actions on private lands. Approximately 10 percent of the 1987 Unit 6 harvest of 2,669 animals occurred in subunit 37 (Griese and Becker, 1988). A large portion of subunit 37 is in private ownership and public access is restricted. Reductions in deer density on private lands may increase the demand for deer hunting opportunities on adjacent national forest lands, and the increased pressure may moderately impact the hunting experience.

Long-Term Effects on Deer Hunting

The deer hunter demand level for a particular area and time is hard to project, as hunter use varies with deer populations, hunter traditions and hunter familiarity of the area. However, in general it is assumed that future demand to harvest deer on Montague Island will increase. It is equally difficult to predict how often demand will be met. Even under current conditions, human demand is probably met less than 50 percent of the time. If all suitable timber on Montague Island is harvested during the life of the rotation, the mean habitat capability will be reduced by 40 percent from current levels (Figure 4-4). However, access will be greatly increased from roading associated with timber harvest activities and opportunities to harvest deer would increase. The ADF&G Prince William Sound management goal, although not formally approved by the board of game, is "to provide the greatest opportunity to participate in hunting deer" (ADF&G, 1976). Success and quality of the hunt are considered less important than the opportunity to hunt (Reynolds, 1979).

The harvestable population at any given time depends greatly on winter severity. Based on past weather conditions, it is estimated that the deer herd on Montague Island would approach the maximum carrying capacity (low snow carrying capacity) and decline severely, possibly 15 times more than a 100-year period. After crashes, the herd will slowly recover.

If long-term reductions in hunter success occur on Montague Island, the result may be increased hunting pressure on other areas in Prince William Sound that support deer populations. Approximately 45 percent of the average yearly harvest of deer in PWS (Game Management Unit 6) occurs on Montague Island. The other islands in the management area account for another 33 percent of the average yearly Unit 6 harvest (Griese and Becker, 1988).

The primitive hunting experience currently preferred by hunters responding to the 1988 deer hunter survey (Griese and Becker, 1988) would be further reduced in the long-term if all suitable timber on Montague Island was accessed by roads and harvested. Future harvest may or may not take place, and under Alternative 7 long-term impacts to the primitive hunting experience would be minimal with the obliteration of the road after completion of harvest on private lands.

Effects on Brown Bear Hunting

Opportunites to harvest brown bear would increase with proposed road and trail construction under Alternatives 2 through 6. In the short-term, legal harvest of bears would likely increase under all action alternatives except Alternative 7. Bears killed in bear/human encounters will likely increase under all action alternatives.

The low reproductive rate of bears may not be able to keep pace with increased harvest in the long-term. More restrictive harvest regulations would likely be the result (Schoen and Beier, 1987) under Alternatives 2 through 6. Brown bear harvest in the Big Islands Management Area is currently low. A total of three and five bears were killed on Montague and Hinchinbrook islands, respectively, in 1985 (Townsend, 1986). Hinchinbrook Island currently supports the largest population of brown bears in the management area.

Long-term impacts to brown bear hunting are unlikely under Alternative 7 as the road will be obliterated after completion of private harvest activities. The previous section on impacts to brown bear habitat capability discusses mitigation measures designed to reduce the level of human/bear interactions.

Effects on Trapping

Roads and trails under Alternatives 2 through 6 would increase access and opportunities to harvest furbearers, especially if vehicles are available. However, access to Montague Island during trapping periods is limited. It is expected that most increased trapping would occur during the periods when logging camps are occupied. Increased harvest may result in less liberal trapping regulations.

Threatened and Endangered Species

Three threatened and endangered marine mammals are uncommon visitors to the near shore waters of Montague Island: the humpback, fin and gray whales. Whales are restricted in the use of near shore waters by shallow water depths. None of the alternatives would have any effect on these species; The National Marine Fisheries Service has concurred with this assessment.

Montague Vole

The Montague vole is listed by the the U.S. Fish and Wildlife Service as a Category 2 species. This indicates that there is concern for the long-term viability of the species; however, not enough information is available to support listing the species as a threatened. Although candidate species are not afforded any protection pursuant to the Endangered Species Act, the Forest Service has initiated studies to determine the status of the species in the Big Islands Management Area. This document includes standards and guidelines (Appendix F) to insure habitat protection until a final determination of the status of the species is completed.

General Effects of Timber Harvest

Voles are generally associated with early successional stage habitats. Initial surveys on Montague Island have identified dry muskeg and uplifted beach as supporting voles; however, surveys have been very limited (Steiner and Giezentanner, 1987).

Effects of Roads and Humans

Effects on Montague vole habitat is likely limited to road construction activities on uplifted beach habitats. Alternative 6 builds the greatest amount of road on the uplifted beach, followed by Alternatives 5, 4 and 7 and Alternatives 3 and 2.

Fish

Summary of Effects Analysis Process

Identification of Anadromous Fish Habitat

The following analysis describes the impacts on anadromous fish habitat as a result of implementing the various alternatives. Because resident sportfish occupy essentially the same habitat as anadromous fish, with the exception of isolated lakes, the impacts to resident fish habitat are assumed to be similar. For this analysis, all B, C, D and E stream channel types on identified streams were considered to be anadromous habitat (Appendix E). Results of recent surveys to identify anadromous habitat were incorporated into the following analyses (Sundberg, 1989; Roningen and Suminski, 1988a, 1988b, 1988c; Metzger and Suminski, 1988).

Stream Priority

Each of the identified fish streams in the management area were categorized as being of very high importance (priority 1), high importance (priority 2), or moderate to low importance (priority 3) based on the historical pink and/or chum salmon escapements, the sportfishing potential of the system, the presence or absence of large structural fisheries enhancement projects and the stream's status as an ADF&G index stream (Map 19). These criteria are further explained in Appendix E. Each fish stream in the management area is important in contributing to the wild stock salmon production, in maintaining stock diversity and in supplementing production when individual streams have poor production because of biological or climatological factors; however, it is assumed that impacts to fish habitat on priority 1 streams would have a greater overall effect to the aquatic habitat capability within the management area than the same impact on a priority 2 or 3 stream.

Aquatic Habitat Management Units

Aquatic Habitat Management Units (AHMU) are the specific land areas which will be managed to protect riparian values and fish habitat. The size and location of an AHMU is a function of stream channel type, stream class, adjacent landforms, soils information and the fish species present. At a minimium, AHMUs include the area 100 feet on either side of perennial streams, lakes and other bodies of water. They also include adjacent areas which substantially influence the riparian zone or which have the potential to adversely affect aquatic habitat. Delineation of AHMU boundaries in proposed project areas will require on-the-ground assessments, including a more detailed channel type classification, prior to project implementation. Some minor changes in harvest unit and road locations may be necessary to comply with direction provided by the management area-wide standards and guidelines. These Standards and Guidelines provide for the maintenance of in-stream and stream side cover, stream bank stability, large woody debris and fish passage for all fish streams. They also provide direction for preventing increased sedimentation of streams. Manage-

ment direction is much more restrictive for AHMUs where anadromous fish are present (Class I streams, Appendices F and H).

Stream Habitat Zones

Stream habitat zones (SHZs) are used as an analysis tool to identify the general areas where there is a high likelihood of encountering anadromous fish habitat. The SHZs were defined by a combination of stream channel type and land type information. They include all of the alluvial fan, low outwash plain, braided stream and high outwash plain land types which lie adjacent to identified anadromous streams. These land types often cover broad areas and include many of the small braided channel fish streams which have not been documented and which are too small to be identified on planning maps. Where none of the designated land types were immediately adjacent to a stream or interconnected lake, a 100-foot strip on each side of the stream and lake was included in the SHZ (Map 19). Appendix E explains how the SHZs were developed in more detail.

The SHZ is assumed to include the majority of the anadromous and resident (Class I & II) aquatic habitat management Units (AHMU). However, the SHZ undoubtedly contain areas with no fish habitat or areas with only small populations of resident fish. They generally do not include Class III AHMUs (Appendix F). Management activities occurring within the SHZ are assumed to have a greater potential for impacts on fish habitat than activities occurring outside this zone.

Effects on Fish Habitat Capability

General Effects of Timber Harvest

Potential effects include reductions in stream bank and stream channel stability, increased sedimentation, alterations in instream and stream side cover, and changes in water temperatures (Gibbons, 1982; Hartman and Holtby, 1982; Elliott 1985; Schwan, et al., 1985). The magnitude of these impacts is directly related to the design of individual harvest units, the intensity of harvest within the watershed and site-specific management practices.

Changes in the quality or quantity of spawning habitat have the greatest potential to affect the capability of streams to produce pink salmon. Large amounts of sediment in spawning gravels decrease the survival of salmon from eggs to fry and decrease the ability of the fry to emerge from the gravels. Adverse impacts can occur if timber harvest reduces stream bank stability and causes an increase in sedimentation. Removing large woody debris (LWD) from streams, either as a direct result of timber harvest activities or as a result of removing the future sources of LWD along stream banks reduces the stability and quality of the available spawning areas.

Modifications of in-stream cover, especially within small rearing tributaries, has the greatest potential for affecting coho salmon habitat capability. A reduction in undercut banks and other high quality rearing habitat can occur where timber is felled and yarded across stream courses without full suspension. The loss of LWD from stream side timber harvest or extensive in-stream cleanup reduces both the amount of in-stream cover and high quality pool habitat. Even when in-stream cover characteristics are maintained during timber harvest, the removal of stream side timber can reduce LWD over the long-term as the existing woody debris decays without being replaced.

An abundance of LWD has been demonstrated to be a critical factor in natural coho production. (Sedell and Swanson, 1984).

Habitat capability for cutthroat trout can be affected by changes in both spawning and rearing habitat in the small tributaries and the upper reaches of anadromous habitat. Because of their size, these streams are particularly susceptible to reduced stream bank stability and loss of in-stream cover.

Potential impacts to fish habitat capability would be avoided or reduced through the application of the Standards and guidelines for timber harvest in riparian areas. Standards and guidelines control the quantity and method of management activities within riparian areas. They guide land management practices which have the potential to cause sedimentation of streamcourses. They emphasize the maintenance of in-stream cover characteristics and stream bank stability. They also provide for the long-term maintenance of LWD in streams. The Big Islands Management Area standards and guidelines for timber harvest in riparian areas are found in Appendix F. Mitigation measures specific to the proposed harvest units for Alternatives 2 through 6 are displayed in Appendix H.

Six parameters are used to evaluate the potential impacts of the various alternatives to fish and fish habitat. They include: 1) the total miles of harvest near streamsides; 2) the miles of harvest near streams within the stream habitat zones (SHZ; see Map 19); 3) the total acres of proposed harvest within watersheds; 4) the acres of harvest within the SHZ; 5) the number of watersheds affected and their relative importance; 6) a subjective rating that estimates the potential for site specific impacts of individual harvest units on fish habitat (Appendix E).

The analysis of harvest near streams does not mean stream bank harvest. The management area-wide standards and guidelines provide for the maintenance of stream side vegetation and actual harvest to the stream bank would be rare (Appendices F and H). The miles of stream side harvest displayed in the following analysis is equal to the sum of the miles of harvest near each side of the stream.

Short-Term Effects of Timber Harvest

Alternative 1 (No Action) - The habitat capability to produce pink salmon, coho salmon and cutthroat trout would remain unchanged.

Alternative 2 - Harvest would occur within the San Juan River (priority 1), two priority 2, and three priority 3 watersheds. No land-disturbing activities would occur within the priority 1 Nellie Martin River drainage. Harvest would be oriented away from stream habitat zones (SHZ) and especially away from the San Juan River SHZ (Map 5 and 19).

This alternative proposes the least harvest near streams and within SHZs of any of the five alternatives that propose timber harvest (Figure 4-21). Timber harvest would occur near approximately two miles of stream side. Harvest near streams in the SHZ would be somewhat less. Harvest to the stream bank would not occur along anadromous streams. A total of 54 acres would be harvested within SHZs. Only 12 acres would be harvested within the San Juan River Priority 1 SHZ (Figures 4-22 A and B).

Unit 49 in the San Juan drainage has a moderate/high rating for potential impacts to fish habitat. Mitigation measures proposed for individual harvest units are displayed in Appendix H.

With the small amount of previous harvest in the project area, the relatively small amount of proposed timber harvest, especially within stream habitat zones, and only one unit with a moderate/high potential to alter aquatic habitat, the timber harvest proposed under Alternative 2 would not be expected to impact populations of any MIS or to affect the aquatic habitat capability within any of the stream systems.

Alternative 3 - Harvest would occur within the San Juan River drainage (priority 1), two priority 2, and three priority 3 watersheds. No land disturbing activities would occur within the Nellie Martin River watershed. Harvest would be emphasized within the San Juan drainage (Map 7 and 19).

Figure 4-21 Potential for effects to fisheries habitat due to proposed timber harvest activities.

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Proposed Private Harvest
Total Miles of Harvest *								
Near Streamsides								
Priority 1 Streams	0	<1	6	2	4	3	0	27
Priority 2 Streams	0	1	1	1	1	1	0	4
Priority 3 Streams	0	0	0	4	3	4	0	5
Miles of Harvest Near								
Streamsides in SHZ *								
Priority 1 Streams	0	<1	4	<1	3	3	0	26
Priority 2 Streams	0	<1	<1	<1	<1	<1	0	3
Priority 3 Streams	0	0	0	5	3	4	0	2
Acres Harvested within								
Watershed								
Priority 1 Streams	0	278	530	341	544	615	0	3970
Priority 2 Streams	0	161	120	67	54	54	0	370
Priority 3 Streams	0	0	0	351	383	339	0	310
Acres Harvested within SHZ								
Priority 1 Streams	0	12	139	8	184	196	0	2650
Priority 2 Streams	0	31	27	20	15	15	0	150
Priority 3 Streams	0	11	7	204	202	164	0	10
Number of Harvest Units								
with Potential Effect								
Ratings of:								
0 = no effect	N/A	20	22	11	12	15	N/A	N/A
1 = low	N/A	7	7	5	4	3	N/A	N/A
2 = low/moderate	N/A	5	4	7	6	4	N/A	N/A
3 = moderate/high	N/A	1	5	4	10	10	N/A	N/A
4 = high	N/A	0	0	0	0	0	N/A	N/A

* Does not mean harvest to the streambank, see Appendix E. Miles of harvest is equal to the sum of the miles of harvest near each side of the stream.

Figure 4-22A Potential for effects to fisheries habitat in major watersheds due to proposed timber harvest.

	Macleod Cr #17070	Nellie Martin R. #17790	San Juan R. #17000	Beach Cr. #17780	Strike Cr. #17870	Deception Creek #17880	Unnamed #17837
Total Streamside Miles	27	112	60	46	13	7	12
Miles of Harvest Near Streamsides *							
Previous Harvest	0	1	1	0	0	0	0
Proposed Private Harvest	4	13	0	15	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	1	0	1	0	0	0	0
Alternative 3	1	0	6	0	0	0	0
Alternative 4	1	0	2	0	3	1	1
Alternative 5	1	1	4	0	1	1	1
Alternative 6	1	1	2	0	3	1	1
Alternative 7	0	0	0	0	0	0	0
Streamside Miles in SHZ	21	89	41	30	11	5	9
Miles Available PFL	4	25	17	15	8	3	5
Miles Suitable PFL	4	14	11	14	7	1	4
Miles of Harvest Near Streamsides in SHZ *							
Previous Harvest	0	1	1	0	0	0	0
Proposed Private Harvest	3	12	0	14	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	<1	0	<1	0	0	0	0
Alternative 3	<1	0	4	0	0	0	0
Alternative 4	<1	0	<1	0	3	< 1	1
Alternative 5	<1	1	2	0	2	< 1	1
Alternative 6	<1	1	2	0	3	< 1	<1
Alternative 7	0	0	0	0	0	0	0

* Does not mean harvest to the streambank, see Appendix E. Miles of harvest is equal to the sum of the miles of harvest near each side of the stream.

Figure 4-22B Potential for effects to fisheries habitat in major watersheds due to proposed timber harvest.

	MacLeod Cr #17070	Nellie Martin R. #17790	San Juan R. #17000	Beach Cr. #17780	Strike Cr. #17870	Deception Creek #17880	Unnamed #17837
Acres of Harvest within the Watershed							
Previous Harvest	50	30	120	20	0	0	0
Proposed Private Harvest	154	1000	0	1908	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	161	0	278	0	0	0	0
Alternative 3	38	0	530	0	0	0	0
Alternative 4	67	0	317	0	152	85	114
Alternative 5	54	114	430	0	184	85	114
Alternative 6	54	282	333	0	203	85	52
Alternative 7	0	0	0	0	0	0	0
Total Acres within SHZ	892	3531	1554	2726	295	66	318
Available PFL	184	1531	436	1765	227	60	193
Suitable PFL	169	1204	351	1648	201	18	180
Acres of Harvest within SHZ							
Previous Harvest	0	145	13	36	0	0	0
Proposed Private Harvest	154	1000	0	1648	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	15	0	12	0	0	0	0
Alternative 3	15	0	139	0	0	0	0
Alternative 4	15	0	8	0	103	8	90
Alternative 5	12	78	106	0	102	8	90
Alternative 6	12	90	106	0	97	8	36
Alternative 7	0	0	0	0	0	0	0
Number of Units with a Moderate/High Rating (3s)							
Alternative 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 2	0	0	0	0	0	0	0
Alternative 3	0	0	4	0	0	0	0
Alternative 4	0	0	1	0	1	1	1
Alternative 5	0	2	3	0	2	1	1
Alternative 6	0	2	3	0	2	1	1
Alternative 7	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Timber harvest would occur near 7 miles of stream. Five miles of harvest would occur near streams within the stream habitat zone (SHZ; Figure 4-21). Complete harvest to the stream bank would not occur along any anadromous streams. One hundred seventy-three acres would be harvested within stream habitat zones. The majority of this, 139 acres, would be harvested within the San Juan River priority 1 SHZ (Figures 4-22 A-B). This would represent approximately 9 percent of the SHZ and 10 percent of the area near the anadromous portion of the stream.

Five units with a moderate/high rating for potential impact to fish habitat would be harvested. They include units 32, 38, 39, 49 and 78. Each of these would occur within the San Juan River SHZ (Figure 4-21).

Because of the acres of timber harvest proposed within the San Juan drainage in Alternative 3, the potential for adverse effects within this priority 1 drainage would be greater than for any other action alternative. Mitigation measures for individual harvest units, displayed in Appendix H, would reduce potential impacts to a level where observable changes in the populations of MIS or aquatic habitat capability would not occur.

Alternative 4 - Harvest would occur within both the priority 1 San Juan River and Nellie Martin River watersheds, although harvest within the Nellie Martin River watershed would be minimal (24 acres). Harvest would also occur in two priority 2 and nine priority 3 watersheds. In general, proposed timber harvest would be oriented away from priority 1 watersheds, and especially away from priority 1 stream habitat zones (SHZ). Harvest would be emphasized in the less important priority 3 drainages (Map 9 and 19).

Timber harvest would occur near 7 miles of stream with 6 miles of harvest near anadromous streams within SHZs. Only one one-mile harvest would be near a priority 1 stream (Figure 4-21). Complete harvest to the stream bank would not occur along any anadromous stream. Two hundred thiry-two acres would be harvested within SHZs. Only 8 acres would be harvested within the San Juan River priority 1 SHZ and no harvest would occur with the priority 1 Nellie Martin River SHZ. Two hundred and four acres would be harvested within priority 3 SHZs, primarily within the Deception Creek, Strike Creek and Stream #17837 watersheds (Figures 4-21, 4-22 A-B). Timber harvest would occur near 27, 20, and 11 percent of the anadromous stream banks and 35, 12 and 28 percent of the SHZ would be harvested for Strike Creek, Deception Creek, and Stream #17837, respectively (Figures 4-22 A-B).

Four units with a moderate/high potential for altering aquatic habitat would be harvested: unit 32 within the San Juan River priority 1 watershed, units 53, 60 and 61 within the priority 3 Strike Creek, Deception Creek, and Stream #17837 watersheds, respectively. Mitigation measures for specific harvest units are displayed in Appendix H.

With the minimal amount of harvest near anadromous stream sides in priority 1 watersheds, the almost total lack of harvest within the SHZ of these streams, and only one unit (Unit 8) with a moderate/high potential to alter habitat, it is highly unlikely that the proposed timber harvest under Alternative 4 would cause any changes in the populations of MIS or in the aquatic habitat capability within the San Juan River watershed.

This level of harvest within the three major priority 3 watersheds would cause a short-term increase in the amount of sediment entering these streams, especially within Strike Creek and Stream #17837. The amount of sedimentation would drop back to

pre-project levels as harvest was completed and ground cover was reestablished. Because of the large natural fluctuations in anadromous fish population levels and the large flow fluctuations and high flushing rates in the affected stream courses, the increased sedimentation from the proposed timber harvest would not cause any observable change in MIS populations or in aquatic habitat capability within the Strike Creek, Deception Creek, or Stream #17837 watersheds.

Alternatives 5 and 6 - Harvest would occur in the San Juan River, the Nellie Martin River, two priority 2 streams, and nine Priority 3 watersheds (Map 11, 13 and 19).

Timber harvest would occur near 8 miles of stream under both Alternative 5 and Alternative 6. From 7 to 8 miles of harvest would occur near streams in the stream habitat zones (SHZ), three miles of which would be within priority 1 stream systems (Figure 4-21). Complete harvest to the stream bank would not occur along any anadromous streams. Between 184 and 196 acres (less than 1 percent of each SHZ) would be harvested within the Nellie Martin River and San Juan River priority 1 SHZs. Between 164 and 202 acres would be harvested within priority 3 SHZs, primarily within the Deception Creek, Strike Creek and stream #17837 drainages (Figures 4-21, 4-22 A-B). The percent harvest near anadromous stream banks and the percent of the SHZ harvested for Deception Creek, Strike Creek and stream #17837 are similar to Alternative 4 (Figures 4-22 A-B).

Ten units with a moderate/high potential to adversely alter aquatic habitat would be harvested. Four units would occur within the San Juan River priority 1 SHZ (Units 32, 38, 39 and 49). Two units would be harvested within the Nellie Martin River priority 1 SHZ (Units 72 and 73). Two moderate/high potential risk units would be harvested within the Strike Creek SHZ (Units 55 and 60) and one unit would occur in each of the Deception Creek (Unit 53) and stream #17837 (Unit 71) drainages. These are Priority 3 stream systems. The mitigation measures for individual harvest units are displayed in Appendix H.

Alternative 5 and Alternative 6 would have the greatest potential to adversely affect the habitat capability for pink salmon, coho salmon and cutthroat trout of any of the timber harvest alternatives (Figure 4-21). However, with the large size of the San Juan River and Nellie Martin River watersheds, and the relatively small percentage of harvest near anadromous stream sides and within the Stream Habitat Zones of these streams, the proposed timber harvest under Alternatives 5 or 6 would be unlikely to cause any observable changes in the populations of MIS or in the aquatic habitat capability within the San Juan River or Nellie Martin River watersheds.

The level of harvest proposed in the three major priority 3 watersheds would cause a short-term increase in the amount of sediment entering these streams, especially within Strike Creek and stream #17837. The amount of sedimentation would drop back to pre-project levels as harvest was completed and ground cover is re-established. Because of the large natural fluctuations in anadromous fish population levels and the large flow fluctuations and high flushing rates in the affected streamcourses, the increased sedimentation from the proposed timber harvest would be unlikely to cause any observable change in MIS populations or in aquatic habitat capability within the Strike Creek, Deception Creek, or stream #17837 watersheds.

Alternative 7 - The habitat capability to produce pink and coho salmon and cutthroat trout would remain unchanged from timber harvest (Map 15).

General Effects of Forest Roading

Roads can affect fish habitat by increasing sedimentation, altering stream channel flows, reducing the amount of spawning and rearing habitat and creating migration barriers for both adult and juvenile fish. The degree of impact is dependant on individual road design, management practices used to implement the project, roading density within the watershed and vehicle use.

The habitat capability of streams to produce pink salmon depends on the quality and quantity of spawning habitat. Road construction activities and road drainage can result in increased sedimentation and reduced quality of spawning habitat. This may be less of a factor on Montague Island than in other areas because extremely heavy rainfall would tend to flush the additional sediment out of the system quite rapidly. Stream crossing structures, except bridges and open bottomed arches, can reduce the amount of spawning area available to pink salmon. On Montague Island, spawning habitat for pink salmon is considered limiting and is commonly confined to the lower reaches of streams in the upper intertidal zone. Reductions in the survival of pink salmon from eggs to fry can be caused by operating machinery in the streambed or disturbing the streambed during the period when the eggs and fry are in the gravels.

Habitat capability for coho salmon is reduced when stream crossing structures create migration barriers for rearing juveniles. Both upstream and downstream migrations of juvenile coho are critical for optimium utilization of rearing habitat. Because of their small size, any stream crossing structure which creates a vertical drop or substantially increases the water velocity has the potential to cause a migration barrier and restrict access to upstream habitat. Cutthroat trout can also be affected by stream crossing structures that create migration barriers. Because cutthroat trout generally spawn in small tributaries and in the upper reaches of anadromous habitat, this species is particularly susceptible to culverts forming migration barriers.

Potential impacts to fish habitat capability would be avoided or reduced through the application of standards and guidelines for road construction in riparian areas. Standards and guidelines control the quantity and methods of management activities within riparian areas. They guide management practices which have the potential to cause sedimentation in stream courses or to cause major losses to salmon eggs and preemergent fry. They also specify fish passage requirements for all fish streams. The Big Islands Management Area standards and guidelines for roading apply universally to all alternatives and are found in Appendix F.

Five parameters are used to evaluate the potential impacts of forest road development to fish and fish habitat under the various alternatives. They include: 1) the total miles of proposed road; 2) the miles of road proposed within stream habitat zones (SHZ); 3) the total number of road crossings; 4) the number of road crossings within SHZs; and 5) the number of watersheds effected and their relative importance (Appendix E).

The above parameters are summarized in the following sections for each individual alternative. A discussion of the consequences to fish habitat capability under each alternative follows in the section common to Alternatives 2 through 7.

Short-Term Effects of Forest Roading

Alternative 1 (No Action) - The habitat capability to produce pink salmon, coho salmon, and cutthroat trout would remain unaffected from roading.

Alternative 2 - Approximately 39 miles of permanent and temporary roads would be constructed from Macleod Harbor to San Juan River (Map 5). The San Juan River, two priority 2 streams and three priority 3 streams would be crossed or would have roads constructed within the watersheds. No land disturbing activities would occur within the Nellie Martin drainage. Only 3 miles would be constructed within stream habitat zones (Figure 4-23). One mile would be constructed within the San Juan River SHZ (Figure 4-24).

At least 23 stream crossing structures would be required. Eleven of these would occur in anadromous habitat within the San Juan River SHZ (Figures 4-23 and 4-24).

Alternative 3 - Approximately 46 miles of permanent and temporary roads would be constructed from MacLeod Harbor to San Juan River (Figure 4-23; Map 7). The San Juan River, two priority 2 streams and three priority 3 streams would be crossed or would have roads constructed within the watersheds. No land-disturbing activity would occur within the Nellie Martin drainage.

Figure 4-23 Potential for effects to fisheries habitat due to proposed forest roading.

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Private lands Proposal
Total Miles of Forest Road Development	0	39	46	59	63	64	34	50*
Miles of Forest Road Development within SHZ								
Priority 1 Streams	0	1	2	3	5	5	1	32*
Priority 2 Streams	0	1	1	2	2	2	2	0*
Priority 3 Streams	0	1	1	6	6	5	5	1*
Total Number of Stream Crossings	0	23	27	36	44	45	22	32*
Number of Stream Crossings within SHZ								
Priority 1 Streams	0	11	15	12	19	20	4	30*
Priority 2 Streams	0	3	3	4	5	4	4	0*
Priority 3 Streams	0	8	6	14	15	15	14	2*

* Patton River/Beach River only. Does not include Macleod Harbor area.

Figure 4-24 Potential for effects to fisheries habitat in major watersheds due to proposed forest roading.

	MacLeod Cr #17070	Nellie Martin R. #17790	San Juan R. #17000	Beach Cr. #17780	Strike Cr. #17870	Deception Creek #17880	Unnamed #17837
Miles of Forest Road Development in Watershed							
Proposed Private	*	16	0	21	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	4	0	9	0	0	0	0
Alternative 3	4	0	16	0	0	0	0
Alternative 4	2	5	11	0	3	1	3
Alternative 5	2	6	13	0	3	1	3
Alternative 6	2	7	13	0	4	1	2
Alternative 7	2	3	2	0	2	<1	1
Miles of Forest Road Development in SHZ							
Proposed Private	*	14	0	19	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	1	0	1	0	0	0	0
Alternative 3	1	0	2	0	0	0	0
Alternative 4	2	2	1	0	2	1	1
Alternative 5	2	3	2	0	2	1	2
Alternative 6	2	3	2	0	1	1	2
Alternative 7	2	<1	<1	0	2	<1	<1
Number of Road Crossings within the SHZ							
Proposed Private	*	18	0	12	0	0	0
Alternative 1	0	0	0	0	0	0	0
Alternative 2	1	0	11	0	0	0	0
Alternative 3	2	0	15	0	0	0	0
Alternative 4	3	4	8	0	4	0	4
Alternative 5	5	6	13	0	3	1	3
Alternative 6	3	9	11	0	2	1	2
Alternative 7	2	2	1	0	2	1	2

* The proposed miles of private road development in the MacLeod Creek drainage is unknown.

Four miles of road would be constructed within stream habitat zones, two miles of this would occur within the San Juan River priority 1 SHZ (Figures 4-23 and 4-24).

At least 27 stream crossings would be required. Fifteen would be in anadromous habitat within the San Juan River SHZ (Figures 4-23 and 4-24).

Alternative 4 - Approximately 59 miles of permanent and temporary roads would be constructed from MacLeod Harbor to Nellie Martin River (Figure 4-23; Map 9). The San Juan River, Nellie Martin River, two priority 2 streams and nine priority 3 streams would be crossed or would have roads constructed within the watersheds.

Approximately 11 miles of road would be constructed within stream habitat zones, with only three miles in the priority 1 San Juan or Nellie Martin SHZs (Figures 4-23 and 4-24).

At least 36 stream crossing structures would be required. Twelve of these would occur in anadromous habitat within priority 1 SHZs (Figures 4-23 and 4-24).

Alternatives 5 and 6 - Approximately 63 miles of permanent and temporary roads would be constructed from MacLeod Harbor to Nellie Martin River (Figure 4-23; Maps 11 and 13. The San Juan River, Nellie Martin River, two priority 2 streams and nine priority 3 streams would be crossed or would have roads constructed within the watersheds.

Approximately 13 miles of road would be constructed within stream habitat zones. Five miles would be constructed within the San Juan River or Nellie Martin River priority 1 SHZs (Figures 4-23 and 4-24).

At least 44 to 45 stream crossing structures would be required. Nineteen to twenty of these would occur in anadromous habitat within priority 1 SHZs (Figures 4-23 and 4-24).

Alternative 7 -- Approximately 34 miles of temporary road would be constructed from MacLeod Harbor to Nellie Martin River (Map 15). One mile of road would be constructed within SHZs of priority 1 streams. Approximately 22 stream crossings would be required, 4 of which would occur on priority 1 streams (Figures 4-23 and 4-24). Under this alternative, all stream crossing structures would be removed when the road is closed. Stream crossing sites would be returned to their natural gradients with stream banks stabilized to the extent possible.

Common to Alternatives 2 through 7 - In the lower reaches of the streams where large quantities of spawning gravel occurs, bridges or other structures would maintain existing streambed conditions and minimize impacts to salmon spawning. Minor reductions in spawning habitat for pink salmon and coho salmon would occur where metal culverts are used for stream crossing structures on smaller streams, but the loss of habitat would be minor and would not result in an observable change in the habitat capability or population levels of any MIS under any of the action alternatives.

The proposed road development activities may cause a short-term increase in suspended and bedload sediment downstream of the road corridors during construction within the affected watersheds. This effect would be short-term and sediment input levels would likely return to pre-project levels shortly after construction was completed and disturbed areas were stabilized. A much smaller but more long-term in-

crease in sedimentation would occur as a result of drainage from the road surface. Removal of the stream crossing structures under Alternative 7 would introduce some additional sediment into the stream systems.

Because of the absence of sediment-loading from existing roads, the relatively small amount of road construction within individual SHZs and the large flow fluctuations and high flushing rates in the affected streamcourses, the increased sedimentation from the proposed road construction under any of the action alternatives would not cause any observable changes in MIS populations or in aquatic habitat capability within the affected streams.

General Effects of Log Transfer Facilities

Marine resources and the biological community in general, may be impacted in several ways. The physical process of transferring logs from an upland facility to saltwater dislodges bark and other organic debris that accumulate on marine substrates. Both plants and animals may be crushed and/or covered by debris. Under circumstances of severe bark accumulation and poor flushing actions by local currents, the water quality of the estuarine environment may be adversely affected. Studies have demonstrated mortalities and/or deformaties in crab populations in areas with heavy bark accumulations. When LTF's are located in areas of shallow water, log bundles strike the bottom and crush any life forms that are present. Marine log storage areas can also impact the marine environment through grounding and water quality degradations. Adverse water quality effects may also result from upland facilities through excessive sedimentation and bark leachates entering surface runoff and streams. Most LTF's require some amount of fill to be placed in the estuary to facilitate access to deep water. This fill covers natural bottom substrates and removes some shallow, productive near shore marine habitats.

The effects of LTF's on fisheries resources have not been quantifiably demonstrated. It is unlikely that any effects on returning adult fish would occur unless the LTF or raft storage areas were immediately adjacent to an anadromous fish stream and caused blockage of entry into the stream. Juvenile pink and chum salmon that spend several months immediately after out migration in protected bays and coves would be more likely to be affected by activities in the marine environment. These small fish are highly mobile as they actively feed on marine invertebrates. Some of their preferred food items live on the bottom surface. Bark accumulation on the substrate could eliminate a small portion of the habitat of those food items. Mortality of the juvenile salmon could also be increased by forcing the fry to migrate around the LTF in deep water where predation will likely be greater.

Potential impacts to marine or fisheries resources would be avoided or reduced through the application of standards and guidelines for siting, construction and operation of log transfer facilities on national forest lands (Appendix F). These guidelines are designed to minimize impacts to sensitive marine habitats and to avoid siting in close proximity to the mouths of anadromous streams.

Camps associated with LTF sites can cause additional use of fisheries and marine resources. The competition for resources at or near logging camp locations would probably increase. There is currently little or no information to indicate that resource allocation problems have occurred as the result of a logging camps in other areas of Alaska.

Short-Term Effects of Log Transfer Facilities

Alternative 1 - Under this alternative, no LTFs would be developed on national forest lands. The natural habitat quality of the marine environment adjacent to National Forest lands would be maintained.

Alternatives 2 and 3 - One LTF would be developed on national forest land on the south side of MacLeod Harbor and would receive logs from the southernmost portion of Montague Island in the vicinity of San Juan Bay. This site was investigated by an interagency dive team (See Log Transfer Facility - Preliminary Site Investigation, Appendix D). Intertidal vegetation at the proposed site was nearly absent and few marine animals were present. Those marine aminals that were present consisted of motile species of no commerical, recreation or subsistence value. Some evidence of small numbers of razor clams was present in deeper waters. The site is located approximately 1/2 mile from the mouth of the nearest salmon spawning stream. No significant effects on the marine environment or anadromous fish is expected as a result of LTF development at this site on the south shore of MacLeod Harbor.

Alternatives 4 through 7 - For these alternatives, no LTF sites would be developed on national forest Lands. One LTF would be developed on private land on the north shore of MacLeod Harbor and would receive logs from all areas proposed for timber harvest on national forest and private lands on south Montague Island. The natural habitat quality of the marine environment adjacent to national forest lands would be maintained.

Effects of Fish Habitat Improvements

Several fish habitat improvement projects in Prince William Sound have increased the habitat capability for anadromous fish. The modification of barriers and the installation of fishways has provided access to previously unavailable habitat. Spawning channel and rearing pond construction has created new habitat. The removal of debris barriers and stream stabilization projects have improved pink salmon spawning habitat, but these projects have so far demonstrated a limited project life on Montague Island. In Southeast Alaska streams, in-stream structures and LWD additions have increased the habitat capability for coho salmon.

The primary purpose of fish habitat improvement projects in Prince William Sound is to increase or maintain the number of harvestable salmon available to the commercial and sport fisheries.

Alternative 1 (No Action) - Feasibility studies would be conducted at four potential fish habitat improvement sites in MacLeod Harbor, Stump Lake and Chalmers River, but none of the projects would be implemented. If feasible, the projects would be retained for possible development in the next planning period. The opportunity to increase the habitat capability by an estimated 141,000 pounds of pink and chum salmon per year and to maintain the habitat capability of a 200-acre lake for coho, sockeye, cutthroat trout and Dolly Varden char would be foregone for the remainder of the planning period.

Alternatives 2 and 3 - Feasibility studies would be completed on eight potential fish habitat improvement sites in the MacLeod Harbor, San Juan Bay and Port Chalmers areas. The feasibility of stabilizing the outlet to Stump Lake to maintain the existing

water level in this 200-acre lake would also be evaluated. If feasible, the projects would be implemented.

The proposed potential projects would increase the habitat capability within the project area by an estimated 166,000 pounds annually of pink and chum salmon and an estimated 36,000 pounds of coho salmon per year. The increased pink and chum salmon production would occur in the MacLeod Harbor and the Port Chalmers areas and would primarily benefit commercial fishermen. The increased coho salmon production would primarily result from a series of rearing pond excavation projects associated with the proposed road construction. The bulk of the increased coho production would occur in MacLeod Creek and San Juan River and would primarily benefit sports fishermen. Three additional stream stabilization projects and barrier modification projects along the road corridor between MacLeod Harbor and San Juan Bay would also increase the opportunities for sports fishing by increasing the habitat capability for coho salmon in these areas.

Lack of access would limit the feasibility of fish habitat improvement projects on the outer coast of Montague Island and within the Nellie Martin drainage.

Alternatives 4, 5 and 6 - Under Alternatives 5 and 6, feasibility studies would be completed on 14 potential habitat improvement sites in the MacLeod Harbor, San Juan Bay, and Port Chalmers areas as well as along the outside coast of Montague Island and within the Nellie Martin River drainage. The feasibility of stabilizing the outlet of Stump Lake to maintain the existing water level in this 200-acre lake would also be evaluated. If feasible, the projects would be implemented.

The proposed potential projects would increase the habitat capability within the project area by an estimated 166,000 pounds annually of pink and chum salmon and an estimated 56,000 pounds of coho salmon per year. The increased pink and chum salmon production would occur in the MacLeod Harbor and the Port Chalmers areas and would primarily benefit commercial fishermen. The increased coho salmon production would primarily result from a series of rearing pond excavation projects associated with the proposed road construction. The bulk of the increased coho production would occur in MacLeod Creek and San Juan River and would primarily benefit sports fishermen. Eight additional stream stabilization projects and barrier modification projects along the road corridor between MacLeod Harbor and the Nellie Martin River would increase the opportunities for sports fishing by increasing the the habitat capability for coho salmon.

Alternative 7 -- No feasibility studies of potential fish habitat improvements would occur as part of this alternative.

Effects of Recreation Developments

Recreation developments such as cabins and foot trails have the potential to cause stream bank erosion and sedimentation if constructed or located improperly or if recreation use is concentrated. However, the activities proposed under any of the action alternatives are unlikely to affect the habitat capability for any of the aquatic MIS.

Proposed trails, cabins and roads will increase access and opportunities to harvest anadromous and resident sport fish. Increased fishing pressure, especially under Alternative 5, may result in more restrictive harvest regulations. A more complete discus-

sion of the combined effects of the proposed actions on fishing opportunities is discussed in the section on fishing.

Cumulative Effects

In addition to the timber harvest and roading activities proposed for national forest lands under the various alternatives, the CAC plans to harvest large tracts of timber in the MacLeod Creek, Nellie Martin River, and Beach River watersheds. For these streams, the combined activities on national forest and private lands may result in significant reductions in aquatic habitat capability for pink and coho salmon.

Adverse impacts to habitat capability are primarily attributed to the planned timber harvest on private lands. It is estimated that essentially 100 percent of the commercial forest within priority 1 SHZs on CAC lands (2,650 acres) would be harvested. This would be approximately 14, 13 and 47 percent of the land adjacent to the anadromous portions of MacLeod Creek, Nellie Martin River and Beach River, respectively. Harvest on private lands would equal 17, 28 and 60 percent, respectively, of the total land area within the SHZs (Table 4-10a-10b). The percent harvest within the Patton River portion of the SHZ, which is a major tributary to Nellie Martin River, would be much greater than displayed for the Nellie Martin River SHZ as a whole.

Timber harvest on CAC lands is assumed to be fully consistent with the requirements of the Alaska State Forestry Practices Act and the Alaska Statute Title 16. However, these regulations generally allow the harvest of all commercial timber in riparian habitats and adjacent to stream banks. Intensive timber harvest adjacent to anadromous fish streams on private lands may significantly reduce the habitat capability for coho salmon within the three affected streams. Similarly, intensive harvest within the SHZ would affect a large percentage of the braided stream channels and coho rearing habitat. Harvesting to the stream banks will reduce stream bank stability through the loss of undercut banks and other in-stream cover. Sedimentation of all aquatic habitats and significant reductions in in-stream and future sources of LWD is expected. The habitat capability of the three affected streams on Montague Island to produce coho salmon will decrease in direct proportion to the reduction of LWD and other in-stream cover.

Both the extent and location of roading needed to support the planned private timber harvest on Montague Island and the decreased stream bank stability associated with harvest to the stream bank will likely combine to increase sedimentation to a level resulting in reduced quality of spawning habitat and a loss of habitat capability for pink salmon (Figure 4-24).

Timber harvest and roading on national forest lands have the potential to increase the combined impacts to the fisheries resources of MacLeod Creek and Nellie Martin River. However, these increases are insignificant when compared to planned actions on private lands. Between 12 and 15 acres would be harvested on national forest lands in the MacLeod Creek SHZ (2 percent). Less than 1 mile of anadromous stream sides would be affected. Alternatives 5 and 6 propose harvest of approximately 2 percent (78 to 90 acres) of the Nellie Martin SHZ, also affecting less than 1 mile of anadromous stream side (Figures 4-22 A-B). Alternatives 4, 5 and 6 propose from 5 to 7 miles of road construction within the Nellie Martin River watershed. Alternative 7 proposes only 1 mile of forest road in the stream habitat zone of the Nellie Martin River. Alternatives 2 through 7 propose from 2 to 4 miles of road construction in the

MacLeod Creek watershed (Figure 4-24). No land-disturbing activities would occur on national forest lands within the Beach River watershed under any alternative.

Although timber harvest and road development on national forest lands increases the overall intensity of disturbance activities within the Nellie Martin watershed, the increase in cumulative effects would be insignificant due to the location of the proposed activites. All harvest on private lands would occur within the Patton River drainage, a major tributary to the Nellie Martin River which enters the main river approximately 1/2 half mile above its mouth. Timber harvest and road development activities on national forest lands would only occur within the main watershed. None would occur within the Patton River drainage.

The potential for adverse impacts to the marine environment and the fisheries resource from the development of LTF is most likely under those alternatives which propose to develop the greatest number of LTFs. Alternative 1 would result in two LTFs on private lands in MacLeod Harbor and Patton Bay. Under Alternatives 2 and 3 two LTFs would be developed on private lands with an additional LTF on national forest lands in MacLeod harbor. Alternatives 4 through 7 propose a single LTF on private lands in MacLeod Harbor.

Bark and debris accumulations at a single LTF would be greatest under Alternative 1 at the Patton Bay site and Alternatives 4 through 7 in MacLeod Harbor. Both sites are located on private land and any impacts would be attributable mainly to timber harvested on private lands in the Patton Bay area.

Interagency investigations of the potential LTF site in MacLeod Harbor on national forest lands indicated the lack of significant estuarine resources. Investigations of the potential LTF site on the north shore of MacLeod Harbor on private land (Appendix D) indentified the presence of several species of kelp and juvenile tanner crab in deeper waters. However, the site has been used previously and is closely adjacent to deep waters which would provide flushing actions to minimize water quality impacts and provide for dispersal of sloughed bark and debris. The closest salmon spawning stream is approximately 1/2 mile distant. No marine investigations of the potential LTF site in Patton Bay have occurred. However, there is little use of the area by commercial fishermen and the site is several miles from the nearest salmon spawning stream. No significant cumulative effects on the marine environment or anadromous fish is expected to result from LTF development at any of the proposed sites under any alternative.

Long-Term Effects

The potential for long-term effects to the fisheries resource on Montague Island depends on the land management practices and techniques used for the proposed timber harvest and road development as well as the timing, location and magnitude of future activities.

The management area-wide standards and guidelines for timber harvest and road development for national forest lands on Montague Island are designed to maintain the existing levels of LWD, provide for future sources of LWD, maintain in-stream cover, maintain stream bank stability, provide fish passage where necessary, and minimize sedimentation from road construction. The aquatic habitat capability for these streams would be expected to remain constant over time. There would be some potential for reduced primary productivity in small streams adjacent to harvest units due to in-

creased shading from second growth stands. However, given future riparian management actions as directed by standards and guidelines, the capability of the aquatic habitat will be maintained.

The habitat capability of streams on Montague Island to produce pink and coho salmon and cutthroat trout would be increased by approximately 200,000 to 225,000 pounds of fish per year if the identified habitat improvement opportunities prove feasible and are implemented. The majority of these projects would provide long-term fisheries benefits for 25 or more years. Proposed stream stabilization projects would likely provide more short-term benefits. Periodic reconstruction would be necessary to retain their effectiveness.

The future aquatic habitat capability of streams on private lands which are subjected to intensive stream bank harvest would decrease substantially. All future sources of LWD would be removed. Habitat capability would decline over time as the existing LWD decayed or was carried out of the system. The long-term reductions in habitat capability for coho salmon would be proportional to the loss of LWD. The reduction in LWD would also effect pink salmon production by destabilizing or removing a portion of the existing spawning habitat. Declines would continue until stream side timber once again grew large enough and began falling into the stream course. Unless a specific habitat rehabilitation measures are initiated to counteract the reductions in LWD, these effects could be expected to last a minimum of 100 years. Harvest to the stream bank may reduce primary production within streams due to increased shading from second growth stands. These effects could be severe in small coho rearing tributaries. Thinning the second growth stands adjacent to stream courses could reduce these effects.

An analysis of the impacts of future timber harvest on Montague Island assumes that all suitable timber on national forest land could be harvested by the end of the rotation. This would include approximately 10,000 acres of additional productive forest land. This analysis assumes that the management area-wide standards and guidelines are maintained through the rotation. Therefore, most of the timber remaining after the current planning period within the San Juan River and Nellie Martin SHZ would not be harvested. Additional harvest would occur within the Strike Creek, Deception Creek, and stream #17837 SHZs, as well as within several small drainages throughout the north and west portions of Montague Island, but the amount and type of harvest would be managed under the standards and guidelines. Little, if any, additional timber would be available for harvest within the MacLeod Creek or Beach River watersheds.

Significant impacts to fish habitat capability from potential future timber harvest are not anticipated.

Any additional harvest of timber on national forest lands on the south end of Montague Island would not require development of additional LTF and effects would be incremental to those resulting from timber harvest planned at present. Potential future harvest of suitable timber on the north end of Montague Island could require the development of an additional LTF. Given the application of the management area-wide standards and guidelines for siting, construction and operation of LTFs, no significant long-term effects are expected from potential future LTF development.

Effects on Fishing

Short-Term Effects

The effects of the proposed activities on commercial and sportfishing would be a combination of the potential increases in habitat capability from habitat improvement projects and the increased access and opportunities to harvest sport fish provided by new roads and trails. None of the proposed timber harvest, forest roading or recreation development activities on national forest lands would have an observable adverse effect on the numbers of fish available.

The proposed fish habitat improvement projects would provide an additional 168,000 pounds of pink and chum salmon per year and approximately 36,000 to 56,000 pounds of additional coho salmon per year on Montague Island if the projects prove to be feasible and are implemented. The majority of the pink and chum salmon would most likely be harvested by commercial fishermen between San Juan Bay and MacLeod Harbor. Some of the additional coho salmon would also be harvested by commercial fishermen, but the majority of these fish would likely be harvested by sport fishermen.

The additional coho salmon and cutthroat trout which would be produced by the proposed habitat improvement projects under Alternatives 2 and 3, if they prove to be feasible, would provide for an estimated increase of 910 wildlife and fish user days (WFUDs). Use rates would increase by approximately 1,180 WFUDs under Alternatives 4, 5 and 6. Increases in WFUDs from other management activities is discussed in the recreation section of Chapter 4.

A substantial sport fishery for coho salmon would be created in MacLeod Harbor. The existing opportunity in the San Juan River would be significantly improved. Several lesser opportunities for sportfishing for coho salmon or cutthroat trout would also be created or improved under Alternatives 2 through 6.

The proposed road and trail construction would increase access to fish streams and opportunities to harvest sport fish. Overall harvest would likely increase over current levels under Alternatives 2 through 6 in the short-term. Those alternatives with the greatest amount of road and trail building and camping facilities would allow for the greatest increase. Access and camping-related facilities are greatest under Alternative 5, followed by Alternatives 6, 4, 3 and 2, respectively. Under Alternative 7, no effects on fishing would occur as the proposed road would be closed to the public.

Cumulative Effects

National forest and private timber harvest and road construction activities on Montague Island would have a high potential to reduce coho salmon, pink salmon and cutthroat trout populations in the Nellie Martin River and Beach River. These results would be almost exclusively a result of actions on private lands. Reductions in the number of coho salmon available in the Nellie Martin River could somewhat reduce the attractiveness of this sportfishing area. Reductions in sportfishing success on the Nellie Martin River or Beach River could also result in increased sport fishing pressure on other areas in Prince William Sound.

Anadromous fish habitat capability in the MacLeod Harbor area could decline somewhat as a result of activities on private lands. Increased production from habitat improvement projects on national forest land, if they prove to be feasible, would tend to offset the declines. Production of coho salmon would increase substantially as a result of the proposed rearing ponds projects and would create an excellent opportunity for a new coho sport fishery. The production of pink salmon in the MacLeod Harbor area would remain at the current level or increase, providing improved opportunities for commercial fishermen.

Long-Term Effects

The existing opportunities for sportfishing and commercial fishing on all streams except the Nellie Martin River and Beach River are expected to be perpetuated for the foreseeable future. The management area-wide standards and guidelines provide for the maintenance of the fish habitat capability on national forest lands. Fish habitat improvement projects, if they prove feasible, would improve a number of existing opportunities and create several new sportfishing opportunities. The majority of these projects would provide long-term benefits with project lives of 25 years or more. Stream stabilization projects would have a much shorter project life and would likely have to be reconstructed periodically to maintain their effectiveness.

Timber harvest and road construction activities on private lands would likely result in a reduction in coho salmon, pink salmon and cutthroat trout populations within the Nellie Martin River and Beach River drainages. Population reductions would continue as the LWD in the streams decayed and the existing habitat deteriorated. A decrease in sportfishing opportunities in these streams would likely increase the sportfishing pressure in other areas around Prince William Sound.

Roads and trails throughout south Montague Island, and eventually throughout Montague Island would greatly increase the opportunities to harvest anadromous and resident sport fish on the island. As sportfishing pressure increases overall harvest, more restrictive harvest regulations could be imposed.

Coordinated Management

Alternative 1 assumes no further national forest development in the management area until the forest plan revision is issued. There would be no opportunities to coordinate management given the objectives of this alternative, Two LTFs and two logging camps would be built on private land.

Alternatives 2 and 3 provide for limited coordinated management with adjacent landowners. The effects of this lack of coordination would be:

1.Increased cost for development of separate road and LTF. Since development costs are not shared, there would be a duplication of some facilities and mobilization costs. Unit costs would be increased because of a loss of economy of scale from the separate road and LTF. This is especially evident in the duplication of log transfer facilities.

2.Environmental effects would be increased by construction of three separate LTFs compared to two in Alternative 1 and one in Alternatives 4 through 7.

Alternatives 4, 5 and 6 would provide for coordinated management with adjacent landowners. The effects of this would be:

1.Reduced cost to the public and the private sector resulting from economies of scale and shared road and LTF development costs. This results in a positive present net value for all national forest resources.

2.Adverse environmental effects to national forest land would be increased over Alternatives 1, 2 and 3 by increases in roading and timber harvest.

3.Adverse effects on the marine and visual resources resulting from construction and operation of one LTF would be less than Alternatives 1, 2 and 3.

4.Alternative 5 provided opportunities to coordinate recreation facilities and services between the Forest Service and private landowners.

5.In Alternatives 4 and 5, the route of the arterial road provides for the best access to national forest resources.

Alternative 7 would limit coordinated management to responding to the CAC request for access between MacLeod Harbor and Patton Bay. The effect associated with this would be as follows.

There would be no Forest Service developments associated with this alternative. Therefore, though south Montague Island would be roaded, there would be no benefits to the management of public lands.

Timber

The Timber section addresses the following aspects of timber management: timber stand productivity, windthrown timber and salvage of windthrown timber, isolation of timber, land designations, the suitable land base, restocking harvested stands, cumulative effects of timber harvest on stand size class distribution, energy requirements for proposed actions, overview of economic analysis methodology, and a financial analysis of timber sale alternatives.

General Effects on Timber Stand Productivity

Timber stand productivity in the management area would remain the same under Alternatives 1 and 7 since no timber management activities would occur during the planning period.

An increase in productivity is expected under Alternatives 2 through 6 that would be proportional to the number of acres of mature to over-mature stands that are converted to more highly productive, even-aged, second growth stands. In mature to over-mature climax stands, annual growth is offset by mortality such that net growth is zero (Hutchinson and LaBau, 1975). In contrast, second growth stands on a 100-year rotation on an average site in the management area (site index 90) will produce about double the cubic foot volume maintained in most mature to over-mature stands (Taylor, 1934). Based on the number of acres that would be converted to second growth, Alternative 6 would increase timber stand productivity the most followed by Alternatives 5, 3, 4 and 2.

Growing sites are improved and made more favorable for Sitka spruce when excessive accumulation of raw humus is reduced (Ruth and Harris, 1979). Large quantities of nutrients tied up in the organic matter are made available to growing plants only through decomposition, a process which works best at warm temperatures (Harris and Farr, 1974). Humus build-up is reversed when the site is exposed to full sunlight after clearcut logging. Based on the number of acres that would be exposed to full sunlight after clearcut logging, Alternative 6 is expected to result in the largest reduction in humus followed by Alternatives 5, 3, 4 and 2.

A further increase in the production of merchantable wood is expected from precommercially thinning 1,968 acres of second growth stands on the west side of Montague Island under Alternatives 2 through 6. Over the life of the rotation, the amended forest plan estimated the timber yield on an average site could be increased by 3.3 thousand cubic feet (mcf) per acre by precommercially thinning second growth stands when they reach an age of 10 to 20 years.

Long-term Effects on Timber Stand Productivity

Of the areas to be precommercially thinned, 20 percent (400 acres) would be thinned under a timber production prescription to maximize timber production. Average tree spacing will be 12 feet. Eighty percent (1,568 acres) would be thinned to benefit wildlife under a wildlife-visual/timber prescription. The latter prescription calls for tree spacings of 16 to 20 feet which is wider than the normal 10 to 14 foot spacing used to maximize timber production. Wider than normal tree spacing on 1,568 acres will reduce the projected timber yield on these acres at the end of the normal 100-year rotation. To maintain projected yields on these acres, the rotation will have to be extended to 120 to 150 years depending on the actual tree spacing used and site indices of the individual stands to thinned.

General Effects of Windthrown Timber and Salvage of Windthrown Timber

The management area is subject to strong windstorms year round from the Gulf of Alaska, which often results in timber windthrow (blowdown). Windthrow is a natural occurrence in the management area but it can be intensified where timber has been exposed to human-caused openings.

Due to wood fiber deterioration over time, existing windthrown timber is assumed to have no commercial value beyond the 10-year life of this plan. Unharvested windthrow may impede natural regeneration of commercial tree species and be detrimental to other resource values. Additionally, windthrown timber can provide breeding habitat for insects and diseases.

Stand examinations conducted during the summer of 1988 revealed concentrated areas of windthrown timber around the mouth of Strike Creek located in the southeast corner of Montague Island and in several stands located near the headwaters of the Nellie Martin River.

Under Alternative 1, there would be no potential for increasing the amount of windthrown timber over what already occurs naturally. Under Alternative 7, the potential for increasing windthrow in timber stands along the road corridor from Strike Creek to the upper Nellie Martin River would exist, but it is expected to be insignificant due to

the narrow width of the road corridor. Under both Alternatives 1 and 7, existing and future windthrown timber would not be salvaged.

The creation of human-created openings (harvest units and roads) under Alternatives 2 through 6 could be expected to increase the potential for some additional windthrown timber in the project area over what occurs naturally. Based on the number of acres to be harvested, this potential could be increased the most under Alternative 6 followed by 5, 4, 3 and 2. In these alternatives, salvage of existing and future windthrown timber in the south Montague Island project area would be emphasized. However, not all windthrown timber would necessarily be salvaged due to other resource considerations and economic infeasibility. Based on the location of proposed access roads and the location of existing blowdown, the opportunity to salvage windthrown timber would be best under Alternative 5, followed by Alternatives 6 and 4. Alternatives 2 and 3 would not provide access to existing windthrown timber.

General Effects of Isolating Timber Stands

Stands of timber can be isolated, or be made difficult to access in an economic and physical sense. An example of isolation of timber stands is when harvest units are designed and laid out without adequate consideration for future access of adjacent timber. Designing a unit for a highlead logging operation where terrain and resource protection considerations would allow a longer reach skyline system to be used, often isolates timber. The consequences of isolating timber may include the following:

Additional roading with its associated costs and environmental impacts may be required in the future to access timber which could have been reached from one road with a complete setting. When additional road construction is not feasible, aerial logging systems, such as helicopter, may be required in the future to access isolated timber.

The short-term operating costs of logging partial settings may be reduced, but the long-term costs may increase substantially if isolated timber is eventually harvested.

To facilitate the development of harvest alternatives for this entry and to prevent the isolation of timber stands for future entries, a multi-entry layout analysis was done for the south Montague Island project area. The analysis identified the location of operable productive forest land and the road networks required to access it over a full rotation of 100 years.

The productive forest land base for the project area and its operable and inoperable components were determined by incorporating timber inventories and the multi-entry layout analysis into a computerized Geographic Information System (GIS).

Standard logging practices in Southeast Alaska and Prince William Sound require unit boundaries to be placed in logical locations dependent upon topography and the type of logging system. Windfirm cutting boundaries were used where possible to minimize future windthrow. Aerial photography, topographic maps and ground reconnaissance were used to develop the multi-entry layout.

Harvest units were developed for Alternatives 2 through 6 by selecting combinations of units and roads. As alternatives were developed, adjustments were made to unit and road locations on the basis of resource protection considerations. Additional minor ad-

justments to unit design are expected to occur as units and roads are laid out to meet on-the-ground conditions and mitigation requirements.

General Effects of Land Designations on the Management Area's Timber Base

Wildlife Habitat Retention Prescriptions

Under Alternatives 2 through 6, 964 acres of productive forest land on Montague Island (see Maps 6, 8, 10, 12 and 14) containing an estimated 23 mmbf of sawtimber would be designated as retention for wildlife habitat. This reduces the acreage of productive forest land that would be available for timber management on Montague Island by 4.0 percent and by 1.8 percent for the management area.

Fisheries Concerns

Under all alternatives, 708 acres of productive forest land in the management area containing an estimated 17.6 mmbf of sawtimber was classified as unsuitable for timber management because of fisheries concerns. These are productive forest stands that are extensively braided by stream channels of variable widths which are classifed as anadromous fish habitat. This reduces the acreage of productive forest land available for timber management by 1.3 percent for the management area.

Green Island Research Natural Area

Under all alternatives, 956 acres of productive forest land on Green Island containing an estimated 25.5 mmbf of sawtimber would be recommended to Congress for designation as a research natural area. This reduces the acreage of productive forest land available for timber management on Green Island by 50.7 percent and by 1.8 percent for the management area.

Hinchinbrook Island Primitive ROS Class

Under the amended forest plan, Hinchinbrook Island will be managed as a Primitive ROS class under all alternatives for the planning period. This made 22,947 acres of productive forest land on Hinchenbrook Island containing an estimated 391.5 mmbf of sawtimber unavailable for timber management during the planning period. However, only 15,014 acres of the 22,947 acres of productive forest land would be classified as suitable for timber management at this time. This reduces the acreage of productive forest land available for timber management on Hinchinbrook Island by 100 percent and by 28.5 percent for the management area.

General Effects of Timber Harvest on the Suitable Land Base

The productive forest land that is suitable for timber management on Montague Island is 13,950 acres (see Map 17). The productive forest land that is suitable for timber harvest for the management area is 17,897 acres (Chapter 3, Figure 3-8).

Under Alternatives 1 and 7, there would be no timber harvest in the management area during the planning period. Alternatives 2 through 6 propose to harvest from 5.6 to 8.7

percent of the suitable land on Montague Island or from 4.3 to 6.8 percent of the suitable land within the management area during the planning period.

General Effects of Restocking Harvested Stands

Law, regulation and policy require that timber may only be harvested from National Forest System land when there is reasonable assurance that such land can be adequately restocked within a reasonable period of time (generally five years after final harvest). Stand restocking may be accomplished by natural means, artificial means (full or fill-in planting), or a combination of both.

All previously harvested stands on Montague Island had adjacent stands that served as seed sources and were successfully restocked naturally without site preparation. The Forest Service estimates that 70 percent of the harvested acreage under Alternatives 2, 3, 4, 5 and 6 would naturally regenerate without site preparation. This estimate is based on soil types, past restocking success and the acreage having adjacent seed sources following final harvest. It is estimated that the remaining 30 percent of the harvested acreage under the same alternatives would require a combination of fill-in or full planting of Sitka spruce seedlings to adequately restock these acres. These areas would probably not restock themselves naturally due to grass and shrub competition and/or the lack of adjacent seed sources following final harvest.

Cumulative Effects of Timber Harvest on Stand Size Class Distribution

Most of the past timber harvest within the management area has taken place on Montague Island. Clearcutting has been used exclusively as the silvicultural harvest system. Since 1947, 8 percent of the productive forest land (PFL) on Montague Island has been harvested by this silvicultural system.

The cumulative effect on stand size class distributions on PFL on Montague Island resulting from previous timber harvest and proposed timber harvest in this entry are displayed in Figure 4-25.

Figure 4-25: Changes in PFL Size Class Acres by Alternative for Montague Island

	Current	Alternatives					
Size Class	Acres	1 & 7	2	3	4	5	6
Seedling/Sapling	2,053	2,053	2,830	3,067	3,052	3,204	3,272
Mature/Overmature Sawtimber	22,465	21,465	21,688	21,451	21,466	21,314	21,246
Acres Proposed for Harvest	0	0	777	1,014	999	1,151	1,219

Energy Requirements

Preparing and administering a timber sale, building roads, harvesting timber and transporting timber to a mill require large quantities of non-renewable sources of energy, usually in the form of gasoline and diesel fuel. The amount of energy that would be consumed in the implementation of each alternative is estimated and displayed in

Figure 4-26. Energy consumption is based on a projection of gallons of gasoline and diesel fuel needed as follows:

Timber sale preparation and administration: 0.5 gallons/thousand board feet.

Logging and water transportation: 5.0 gallons/thousand board feet

Road construction: 4,000 gallons/mile

Road maintenance: 20 gallons/mile

Other energy needs are estimated to be insignificant.

Figure 4-26: Estimated Fuel Consumption by Alternative

	Alternatives						
Fuel Consumption	1	2	3	4	5	6	7
Gallons First Entry	0	269,365	354,085	385,817	445,44	456,467	143,112

Overview of Economic Analysis Methodology

Chapter 4 contains two different economic analyses that provide different viewpoints of the economic aspects of the range of alternatives presented in this document. In both analyses, projections of benefits and costs of proposed projects was limited to the 10-year planning period.

The first analysis, located here in the timber section, is a financial or sale appraisal analysis of the proposed timber sale in Alternatives 2 through 6. It provides a comparison of appraised net values of the proposed timber sale for each of the above alternatives. Appraised net value equals the mid-market selling value of the timber minus logging costs, transportation costs, road building costs, LTF construction costs, manufacturing costs and an allowance for profit and risk. This analysis does not include the costs of reforestation, precommercial thinning, or preparing and administering the timber sale. In addition, the analysis does not include any future benefits resulting from the road network or increased timber productivity since these benefits would not be realized during the 10-year planning period.

The second analysis, located in the socio-economic section of this chapter, is a present net value (PNV) analysis. This analysis looks at the discounted benefits and costs of all proposed projects in each alternative including recreation projects, fish projects, wildlife projects, road and LTF development, sale preparation, sale administration, timber harvest, reforestation, and precommercial thinning. It provides a comparison of the relative overall economic efficiency of each alternative.

Financial (Appraisal) Analysis of Alternatives

After timber harvest alternatives for the south Montague Island project area were developed, a timber sale appraisal analysis of each alternative was performed. The purpose of this analysis is to determine and compare the net appraised value of the timber sale for each alternative under a mid-market condition.

The data used to develop selling values and manufacturing costs for mid-market conditions is based on historical appraisal data from the Alaska Region of the Forest Service. The mid-market condition is defined as follows:

The value and product mix that most closely matches half the absolute difference between the quarter with the highest appraisal values for end product selling price and the quarter with the lowest appraisal values for end-product selling price, during the past 10 years. Value and product mix are measured by the R-10 Index Operation and adjusted to current dollars. The most current available appraisal data for mid-market conditions is base year 1987, adjusted to the third quarter of 1988.

Timber Values

Timber values are related to a) prevailing market conditions and the international demand for the cants and pulp produced after local processing; b) the volume class distribution since logs from low volume stands tend to have lower value than those from high volume stands and c) species and grade composition.

After the all-time poor market conditions that occurred in the early 1980s, market conditions for Alaska timber have improved steadily. The market at this time is continuing to improve and is considered to be slightly above a mid-market condition. For this analysis, species composition and grade estimates were obtained from an analysis of all previous timber sales on Montague Island and are available in the planning record.

Timber Costs

Timber harvest costs are directly influenced by: a) the volume class distribution in each alternative since low volume stands are more expensive to harvest due to lower volumes per acre and smaller logs; b) the method, or logging system, used to yard the timber and c) road and LTF development costs.

Harvest costs used in this analysis are the most current available and are based on Alaska region appraisal data, adjusted to 1987 (FSH 2409.22 AMD 82) for each logging system. Log transfer site and road construction costs were developed based upon historical cost averages from Southeast Alaska incurred under similar conditions to those on Montague Island and in Prince William Sound.

Assumptions

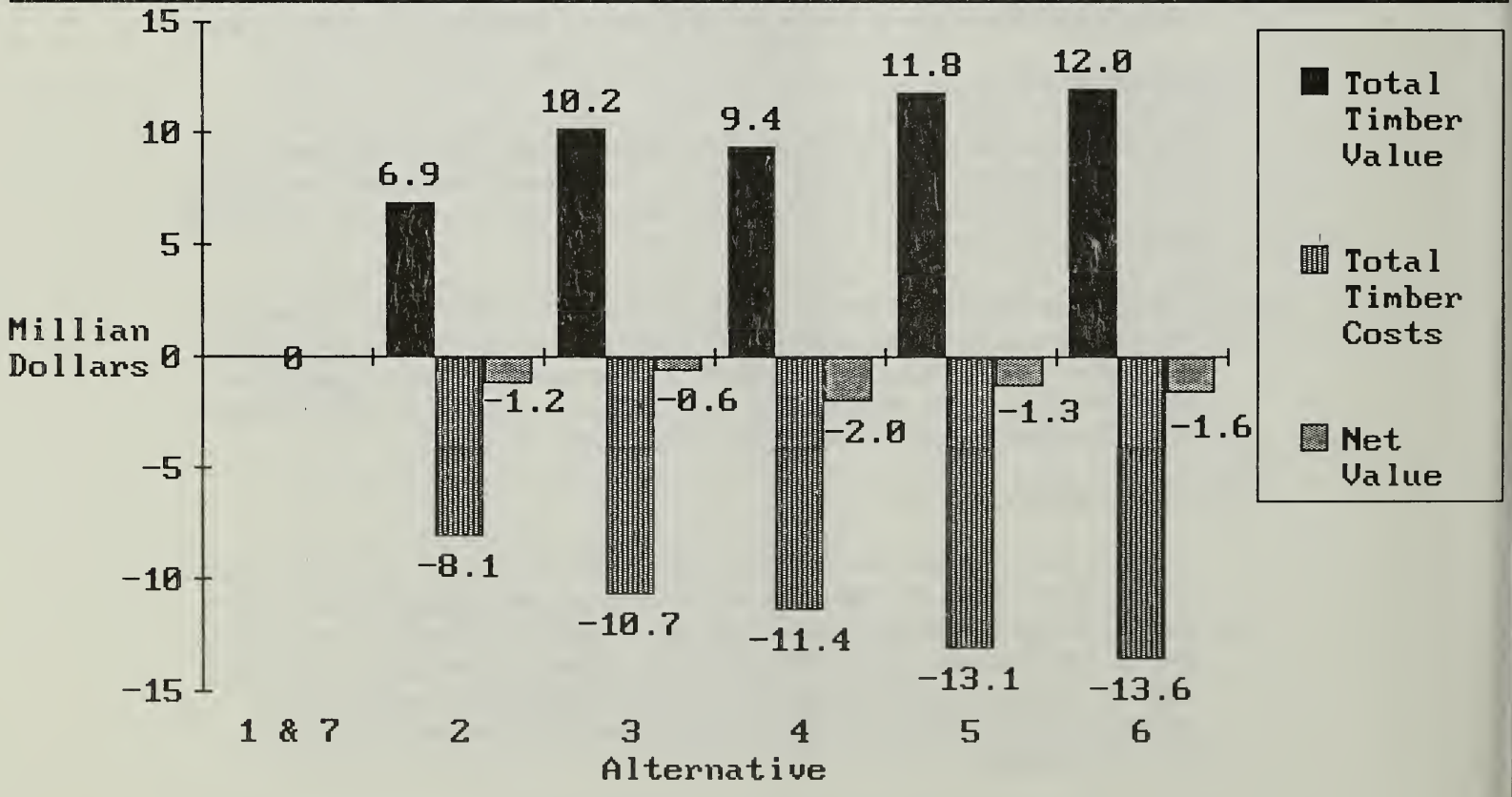
Since the Forest Service has received a request from the CAC for road access across national forest land to connect its lands at MacLeod Harbor and Patton Bay, two timber sale appraisals were performed for the Forest Service timber sale under Alternatives 4, 5 and 6 to address different roading assumptions or scenarios for these alternatives. In both scenarios, Alternatives 1 and 7 are displayed for comparison purposes only as neither of these alternatives propose Forest Service timber sales or road construction.

Under scenario 1, the timber sale in each of the alternatives was appraised with the Forest Service constructing all specified roads under each respective alternative (Figure 4-27).

Scenario 2 considered the CAC request for access to its lands via an arterial road from MacLeod Harbor to Patton Bay. Under this scenario, it was assumed CAC would

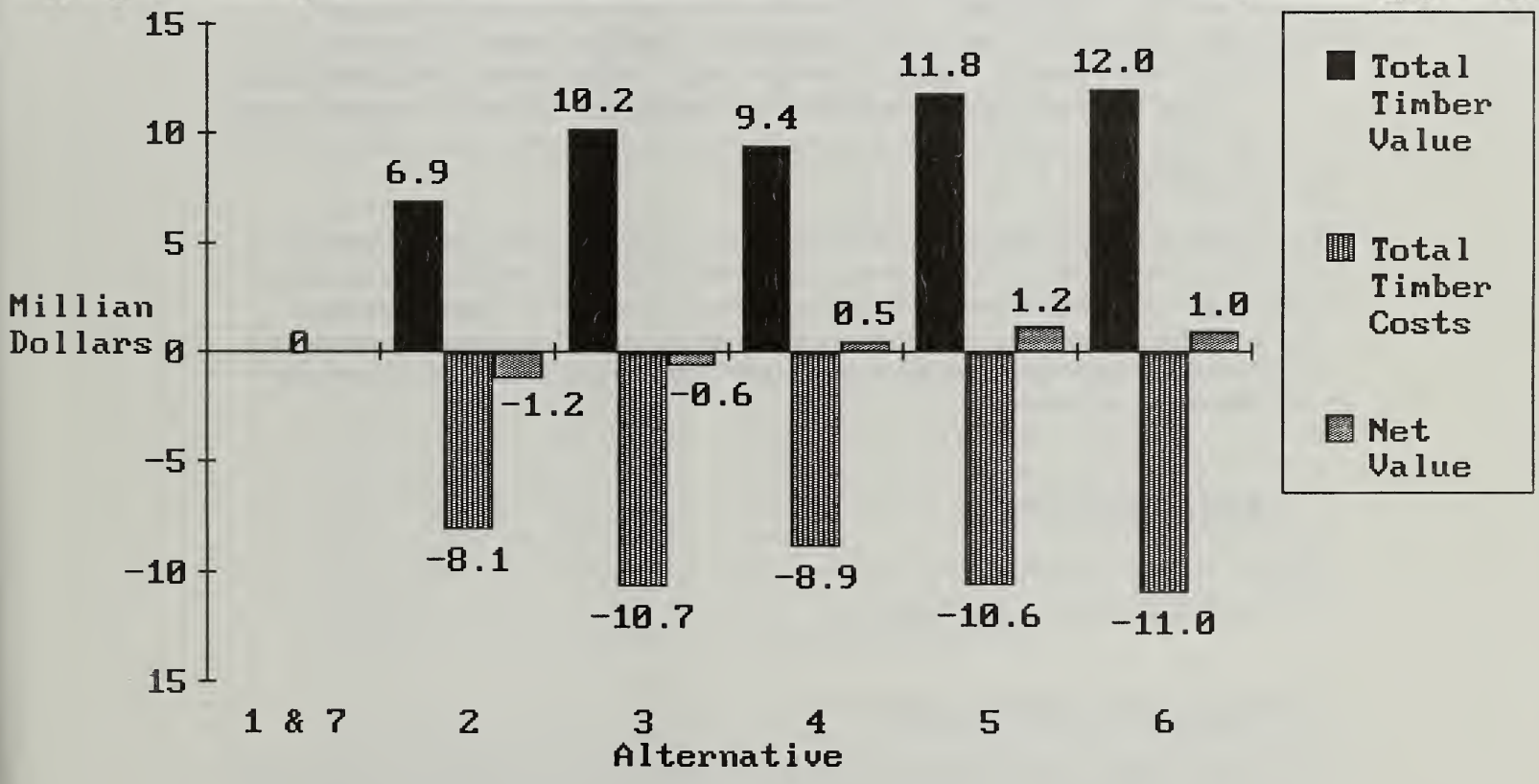
be granted access to its lands via an arterial road and that the Forest Service and CAC would share in the cost of building the arterial road since both would benefit under Alternatives 4, 5 and 6. To assess what benefits a potential cost share arterial road would have on the Forest Service timber sale for Alternatives 4, 5 and 6, a second timber sale appraisal was done for these alternatives. In the second appraisal, the Forest Service would still construct all collector, local and temporary roads for its timber access. To determine the Forest Service cost of the arterial road, it was assumed that CAC would pay for 63 percent of the arterial road cost and that the Forest Service would pay for 37 percent. This cost-share ratio is based on an additional assumption that a cost share agreement would be based on the volume of timber that CAC would be hauling over the road verses the volume of timber on public lands that would served by the arterial road (Figure 4-28).

Figure 4-27 Financial Analysis Summary for Scenerio 1, Direct Timber Harvest Costs/Value with No Cost-Share Agreement for Road Construcion



The net timber sale values reflected in this analysis do not represent gross or net stumpage returns to the government. Since the timber sale will not be offered until 1993, timber market values and harvesting costs used in this analysis may differ from the values and costs used in the final sale appraisal. Actual appraised sale rates will be determined by using appraisal data in effect at the time the sale is actually appraised.

Figure 4-28 Financial Analysis Summary for Scenerio 2, Direct Timber Harvest Costs/Value with a Cost-Share Agreement for Road Construcion in Alternatives 4, 5 and 6



Summary

The above figures provide a means of comparing the short-term costs and revenues of the alternatives relative to each other under a mid-market condition. The cost differences between alternatives are due to differing volume class distributions, logging systems and transportation systems in each alternative.

Figure 4-27 summarizes the result of the timber sale appraisal for Alternatives 2 through 6 under scenario 1. Alternatives 1 or 7 have the highest net value even though it is zero. Ranking in order of decreasing economic feasibility are Alternatives 3, 2, 5, 6 and 4.

Under scenario 1 in which the Forest Service constructs all roads, the timber sale in Alternatives 2 through 6 would be a deficit sale under mid-market conditions. This deficit is due to the large capital investment in roads. To make this sale economically feasible, the sale would require supplementation of funds to offset road construction costs during this entry.

Figure 4-28 summarizes the result of the timber sale appraisal for Alternataives 4, 5 and 6 under scenario 2. Values from Figure 4-27 for Alternatives 2 and 3 are included in Figure 4-28 for comparison with the other alternatives. Alternative 5 has the highest net value. Ranking in order of decreasing economic feasibility is Alternatives 6, 4, 1 or 7, 3 and 2.

If the Forest Service splits the cost of the arterial road with CAC under Alternatives 4, 5 or 6 using a 63/37 cost-share ratio, the Forest Service timber sale in these alternatives would not be deficit under mid-market conditions. Any changes in the above ratio would tend to make the Forest Service timber sale either more favorable or less favorable, depending on whether or not the Forest Service portion of the road cost decreased or increased

Recreation

General Long-Term Effects

Common to All Alternatives

Under all action alternatives, there would be a general shift from primitive to motorized recreation opportunities on the south part of Montague Island as would be expected when roads provide access to areas which were previously unroaded. Hunter access to the interior and alpine areas of south Montague Island would be improved with the proposed roads and trails. Primitive conditions would be maintained on Hinchinbrook, Hawkins, and Green islands. Additional developed facilities are proposed at varying levels and most are proposed for the south end of Montague Island. All alternatives expect an increase in visitor use for this part of Prince William Sound and an emphasis is being placed on helping the public understand low impact techniques for Montague Island.

Two factors which are important when evaluating the alternatives for the recreation resource are: 1) whether they meet the amended forest plan goals for recreation and 2) whether they meet the Management Area-wide goals for recreation.

The recreation management goals for the management area include:

1. Increase developed and dispersed recreation opportunities.

2. Enhance marine recreation opportunities.

3. Maintain dispersed recreation opportunities.

4. Emphasize Primitive and Semi-primitive non-motorized recreation.

Alternatives 1 and 7 meet the forest plan goals to maintain dispersed recreation opportunities and emphasizes Primitive and Semi-primitive Non-motorized recreation.

Alternatives 2 through 6 meet the first three recreation goals through the proposal of recreation projects shown on alternative Maps 5-14. These range from recreation cabins to anchor buoys to new trails. Alternatives vary by degree of development. The fourth goal is also met in all alternatives through the maintenance of primitive conditions on the north end of Montague, Hinchinbrook, Hawkins, Green and Little Green islands, and The Needle, and in Alternatives 2-7 in the addition of 20,000 to 30,000 acres of Semi-primitive Non-motorized recreation on south Montague Island.

The forest plan also required an evaluation of the feasibility of establishing a system of marines recreation areas that is compatible with the state's marine park system. The primary objective of each area is to maintain natural-appearing landscapes and recreation settings. These areas may or may not surround suitable small boat anchorages but would provide marine recreation opportunities. Some of those areas identified in the forest plan and the state's Prince William Sound area plan and/or which were located in areas considered for development, were placed under the marine recreation prescription. This prescription provides for maintaining the qualities which constitute a marine recreation setting. Excellent opportunities for marine recreation occur on the north end of Montague. Marine recreation prescriptions were applied to Rocky Bay, Zaikof Bay, Stockdale Harbor and Port Chalmers for Alternatives 2 through 6 (see Maps 6, 8, 10, 12 and 14). Other areas identified in the Forest Plan for marine recreation systems include Gibbon Anchorage on Green Island, Double/Anderson Bay and Constantine Harbor on Hinchinbrook Island. These areas were not assigned a marine recreation prescription because no activities were proposed.

The amended Forest Plan requires that Hinchinbrook Island be managed consistent with maintaining Primitive ROS class (formerly Primitive II) conditions until the plan is revised. All alternatives including no action meet the conditions specified in the forest plan for Primitive ROS class conditions. Projects which would result in altering the Primitive recreation setting are not recommended for Hinchinbrook Island. The new public recreation cabin recommended for Shelter Bay is consistent with the forest plan.

The amended forest plan also requires that "current recreation use and other pertinent data from the Forest Service Recreation Information Management (RIM) and other sources will be incorporated into the analysis." This requirement was met and is documented in Blanchet's report on recreation users in Gravina - Big Islands Area, 1988.

Direction from management area-wide standards and guidelines include:

Increase and enhance a variety of recreation opportunities with an emphasis on making the management area more accessible and usable. Recognize the sig-

nificance of existing recreation uses such as hunting, fishing, beachcombing, camping and boating. Maintain highly attractive recreation settings that continue these uses.

Alternatives 2 through 6 increase recreation opportunities and emphasize making the area more accessible and usable. Opportunities for improving access included constructing roads and trails, providing boating facilities and improving airstrips where practical. A road along the south end of Montague was a major contribution to improving access except in Alternative 7.

Significant factors in the evaluation of the recreation resource are:

1. recreation settings for the key recreation complexes,

2. the ROS classes

3. recreation visitor use levels.

Analysis of the recreation resource identified three existing recreation complexes on south Montague Island as key recreation areas enjoyed by the majority of the visitors to south Montague. These are San Juan Bay, Stump Lake and Nellie Martin River. In addition, Jeanie Cove was identified as an excellent location for a new recreation complex because of the wheeled landing on the beach and the excellent beachcombing, hunting and fishing opportunities.

Conditions which comprise the desired recreation opportunity are maintained in all alternatives for Stump Lake and Jeanie Cove with the exception of Alternative 6 for Jeanie Cove. Irreversible changes to the primitive recreation setting would occur as a result of the road for San Juan Bay and Nellie Martin River. More detail is found in the discussion under each alternative.

Recreation prescriptions in Alternatives 2 through 6 were used to provide standards and guidelines for those areas which were identified as: 1) key recreation complexes - areas which include excellent recreation opportunities and/or high public use and 2) unique recreation settings or opportunities, which were located where other resources had proposed projects which might alter the setting.

Semi-primitive Non-motorized (SPNM) prescriptions were applied to a number of areas along the inside coast of Montague Island. One area is the lagoon south of Port Chalmers which has been identified as a potential site for a public recreation cabin. Since pre-commercial thinnings are planned nearby, this prescription will maintain the desired recreation setting. Between the Lagoon and Hanning Bay, a number of beaches used by kayakers for camping were identified as unique opportunities for the management area. These recreation settings would be maintained by the application of SPNM in the areas proposed for pre-commercial thinnings. A primitive recreation setting would be maintained at Stump Lake and Jeanie Cove (except in Alternative 6) by prescribing Semi-primitive Non-motorized recreation. In Alternative 6, the road would be within 1/2 mile of the proposed recreation cabin, so Semi-primitive Motorized is prescribed at Jeanie Cove. Maintaining the current conditions at Stump Lake is important because it includes two very desirable public recreation cabins and it is the only lake providing floatplane access on south Montague Island. Jeanie Cove is unique and significant because it is located on the gulf side of Montague and offers excellent beachcombing opportunities. In addition, the Alternative 6 road location would change the primitive character of Jeanne Cove.

One other small area of SPNM recreation is prescribed around the recreation cabin at Nellie Martin River to maintain the non-motorized setting. It was recognized that ATV users would use the foot trail from the beach landing to the cabin to connect with the arterial road, if no other provision was made. Therefore an ATV trail is proposed from the wheeled beach landing to connect with the main road which does not directly impact the Nellie Martin River cabin. Semi-primitive Motorized recreation was prescribed at San Juan Bay, Nellie Martin River, and Beach River for Alternatives 2 through 6 and for MacLeod Harbor in Alternative 5. This was to maintain the recreation settings for those key recreation complexes.

The major change for Alternatives 2 through 7 in the ROS class is the change in south Montague Island from an unroaded to roaded area. In Alternatives 2 and 3, the Patton Bay to Cape Cleare area is unroaded. In Alternatives 4, 5, 6 and 7, the roaded area includes the main transportation route from MacLeod Harbor to Patton Bay. In considering the entire Big Islands Management Area, the change in number of Pristine and Primitive acres is not significant (see Figure 4-29). Considering south Montague Island only (see Figure 4-30), the change is dramatic (Maps 20-25).

The proposal to construct roads on south Montague Island could be viewed as having both positive and negative effects. Except in Alternative 7, constructing the road around south Montague achieves the objective of making the management area more accessible and usable. It provides new opportunities for semi-primitive motorized recreation. A motorized route around the south end of the island improves hunter access to alpine areas. In addition, it provides a mix of recreation opportunities on the south end of Montague Island where it is currently heavily weighted toward Pristine and Primitive recreation opportunities. On the other hand, for those desiring to maintain all primitive areas, the road on south Montague Island could be viewed negatively. Figure 4-29 shows the number of acres by ROS class as they change by alternative from the existing condition for the management area. Because the management activities primarily take place on the south end of Montague Island, Figure 4-30 was prepared to show the changes.

Figure 4-29 Comparison of Recreation Opportunity Spectrum (ROS) Class by Alternative
Big Islands Management Area

	Acres by Alternative						
ROS Class	Existing / 1	2	3	4	5	6	7
Pristine (formerly Primitive I)	194,129	123,287	123,287	123,287	123,108	123,287	123,287
Primitive * (formerly Primitive II)	32,939	117,746	117,746	94,900	94,900	94,900	29,651
Semi-Primitive Non-motorized	90,450	77,227	75,047	86,603	83,588	86,637	145,833
Semi-Primitive Motorized	21,752	13,059	16,169	15,107	17,829	15,000	21,591
Roaded Modified	9,778	9,778	9,778	9,778	9,778	9,778	9,778
Roaded Natural	0	7,719	6,789	19,142	19,615	19,214	18,680
Rural	529	739	739	739	739	739	739

Pristine acres are reduced by about 1/3 for Alternatives 2 through 6 due to the proposed road on the south end of Montague Island. Most of this reduction in Pristine is due to those acres reclassified as Primitive ROS. Primitive acres in Alternatives 4,5 and 6 reflect the entire south end of Montague as being roaded rather than just the west half of south Montague Island. Semi-primitive Non-motorized (SPNM) appears to be reduced (from 5-15%) for Alternatives 4,5 and 6 and 2 and 3 respectively. This downward trend in SPNM acres, for Alternatives 2-6, results from the SPNM acres reclassified to Primitive on Hinchinbrook Island. The apparent averaging out of acres in Alternatives 4 through 6, results from the Primitive acres on south Montague reclassified as SPNM due to the adjacent road. The decrease in Semi-primitive Motorized acres is the results of the changes required for Hinchinbrook Island as described earlier. The changes in the Roaded Natural ROS class reflect the arterial and other road locations. Alternative 7 acreages reflect only the proposed arterial road location for Alternative 4.

* An amendment to the forest plan, known as the settlement agreement, required that Hinchinbrook Island be managed consistent with Primitive ROS class condition. Over half of the change in Primitive acres between Alternative 1 and Alternatives 2 through 7 reflect the settlement agreement acres. To display Primitive ROS class management, the ROS inventory on Hinchinbrook Island were reclassified Primitive or Pristine.

Figure 4-30 Comparison of Recreation Opportunity Spectrum (ROS) class by Alternative for South Montague Island Only

Acres by alternative

ROS Class	Existing / 1	2	3	4	5	6	7
Pristine (formerly Primitive I)	56,201	2,056	2,056	2,056	1,877	2,056	2,056
Primitive (formerly Primitive II)	3,950	23,488	23,488	641	641	641	641
Semi-Primitive Non-motorized	4,951	27,000	24,820	36,375	33,361	36,410	43,767
Semi-Primitive Motorized	505	5,113	8,223	7,161	9,882	7,054	457
Roaded Modified	616	647	647	647	647	647	647
Roaded Natural	0	7,719	6,789	19,142	19,615	19,214	18,454
Rural	78	288	288	288	288	288	288

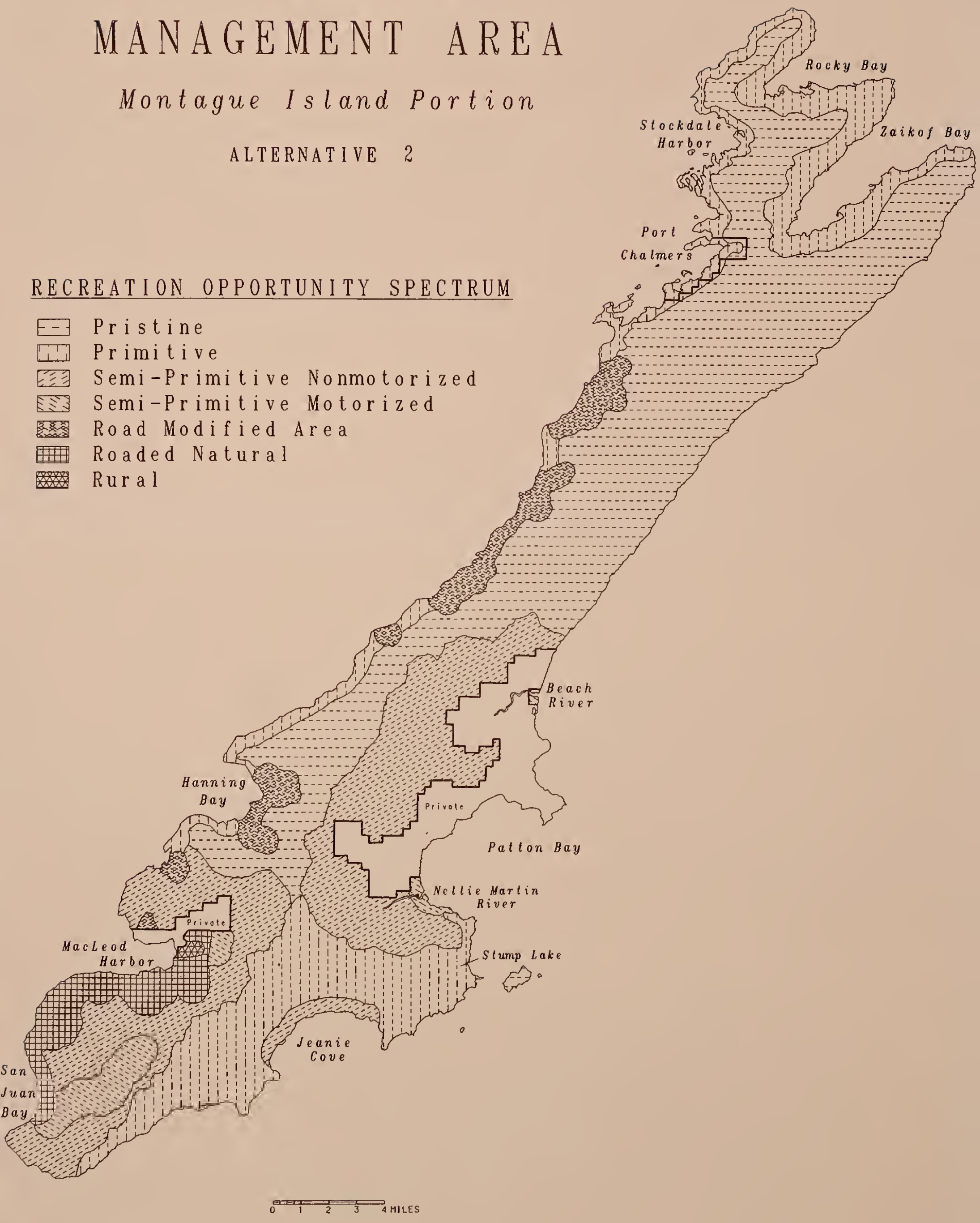
4 Environmental Consequences

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 2



MAP 20

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 3

RECREATION OPPORTUNITY SPECTRUM

- Pristine
- Primitive
- Semi-Primitive Nonmotorized
- Semi-Primitive Motorized
- Road Modified Area
- Roaded Natural
- Rural



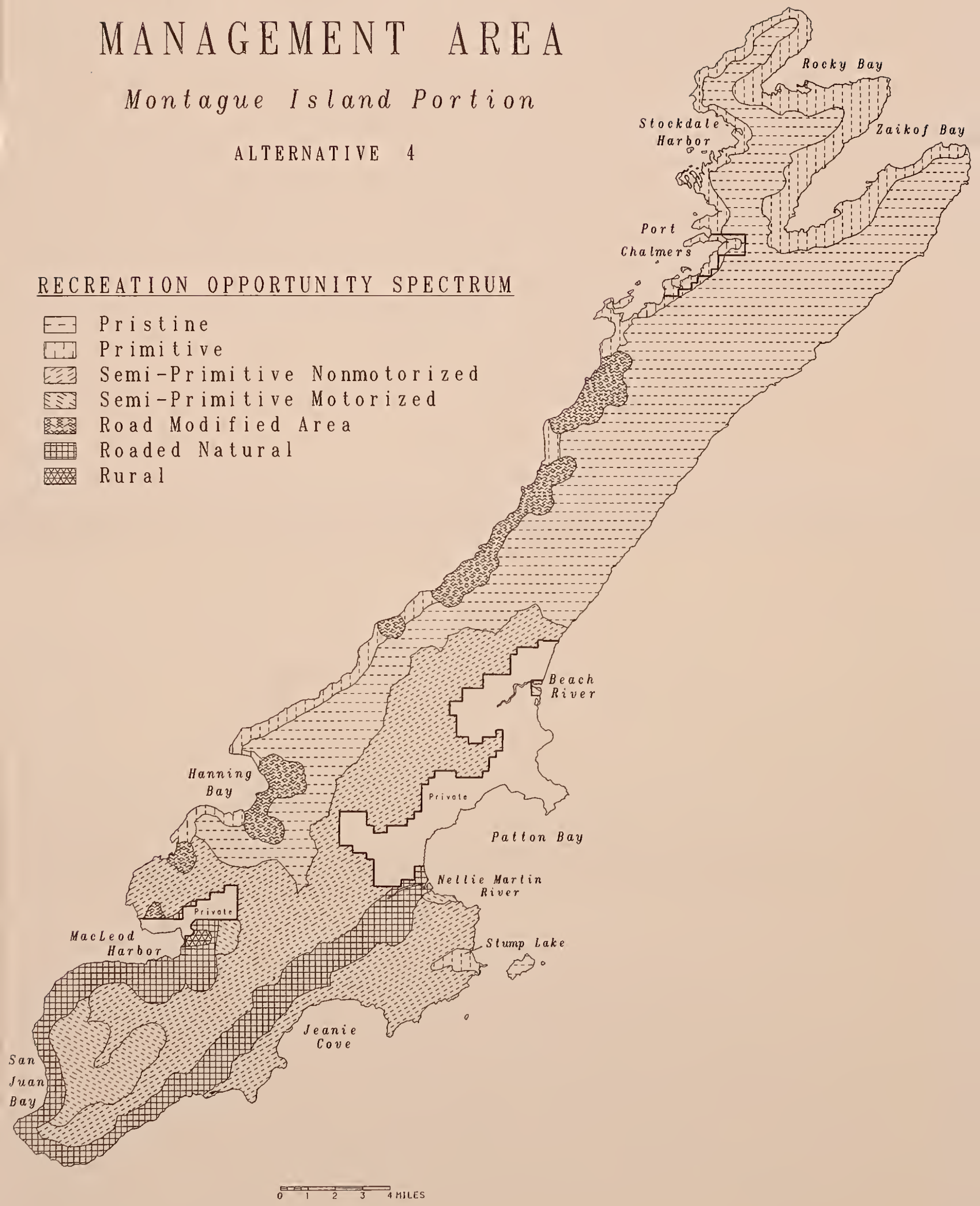
MAP 21

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 4



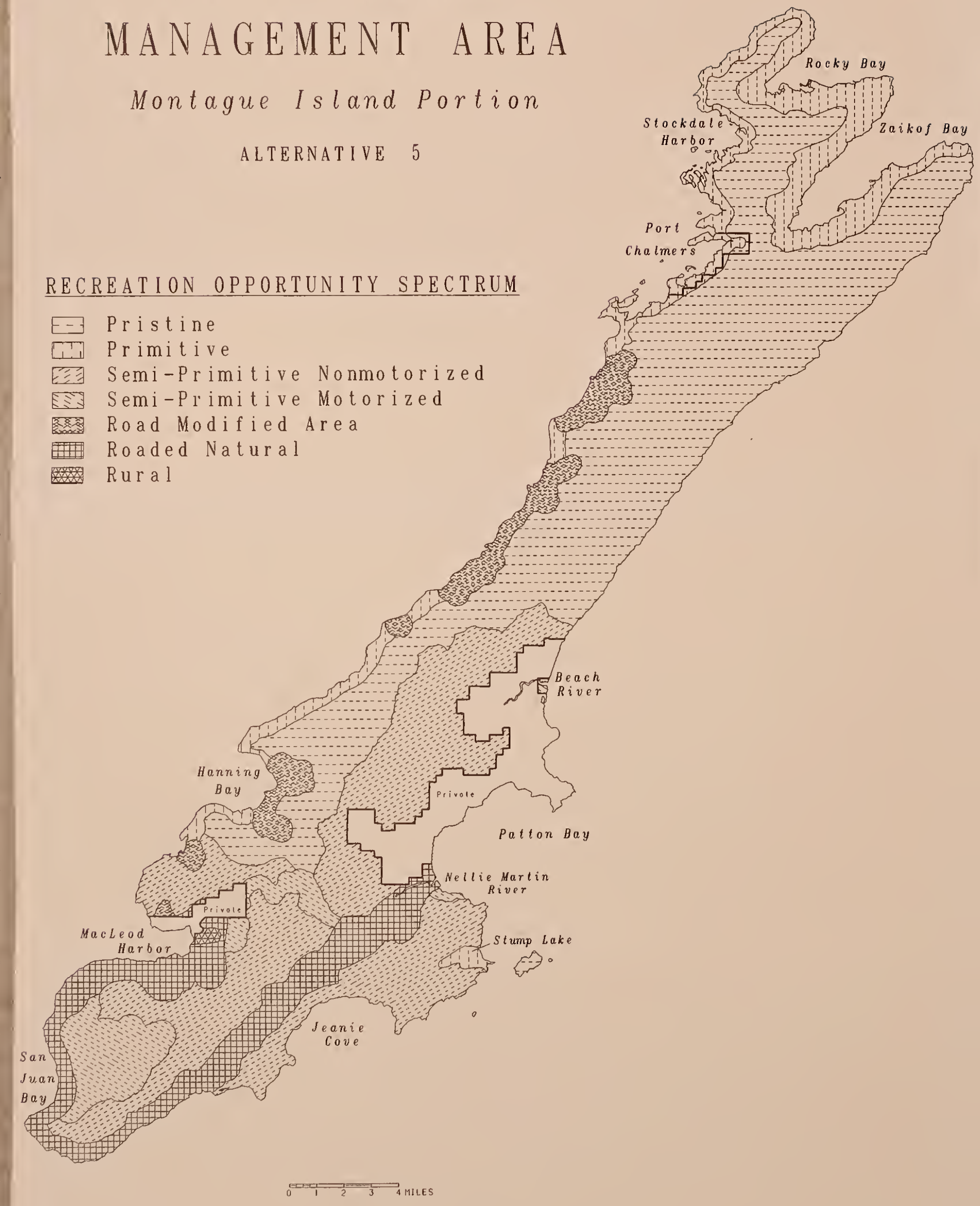
MAP 22

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 5



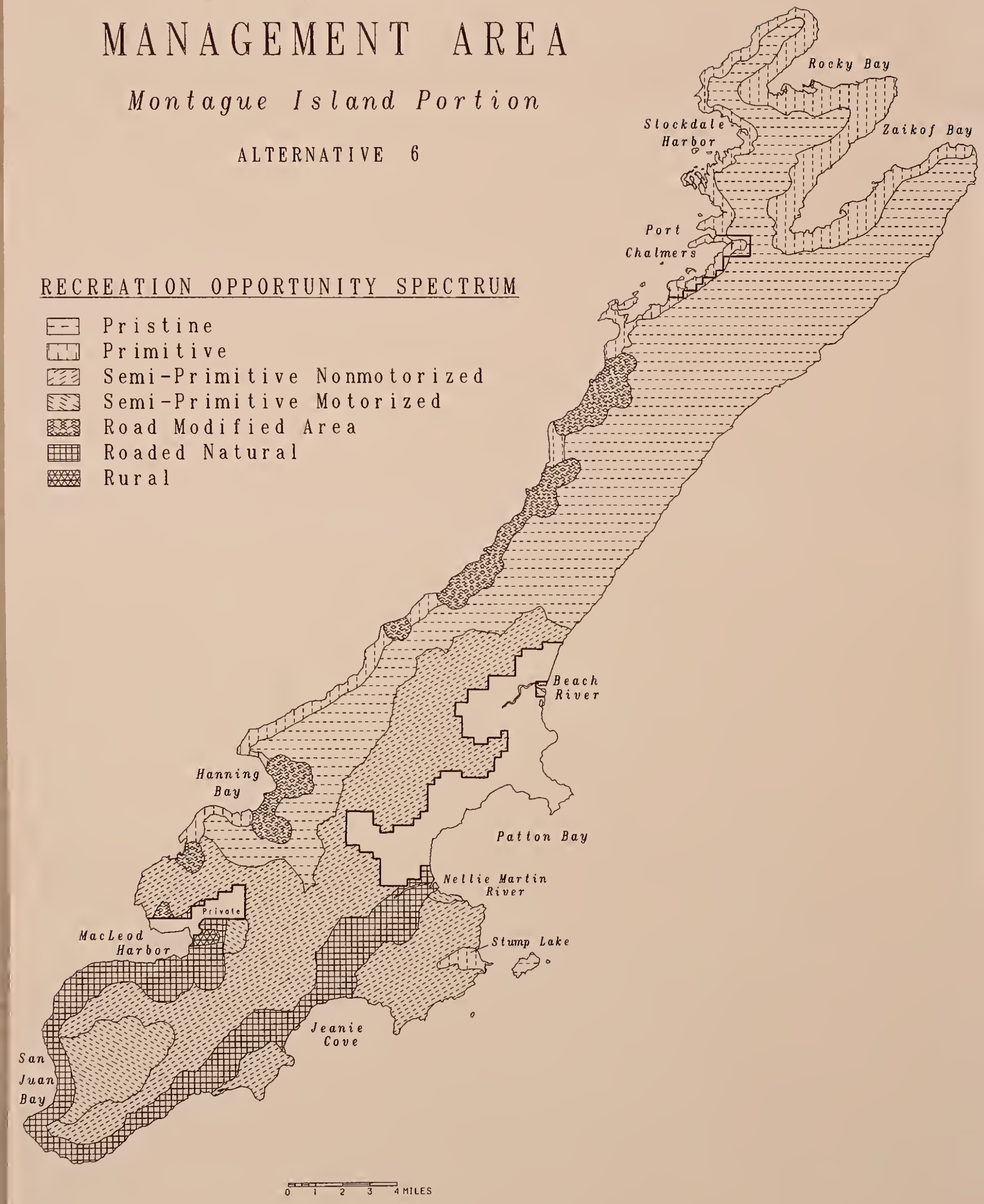
MAP 23

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 6



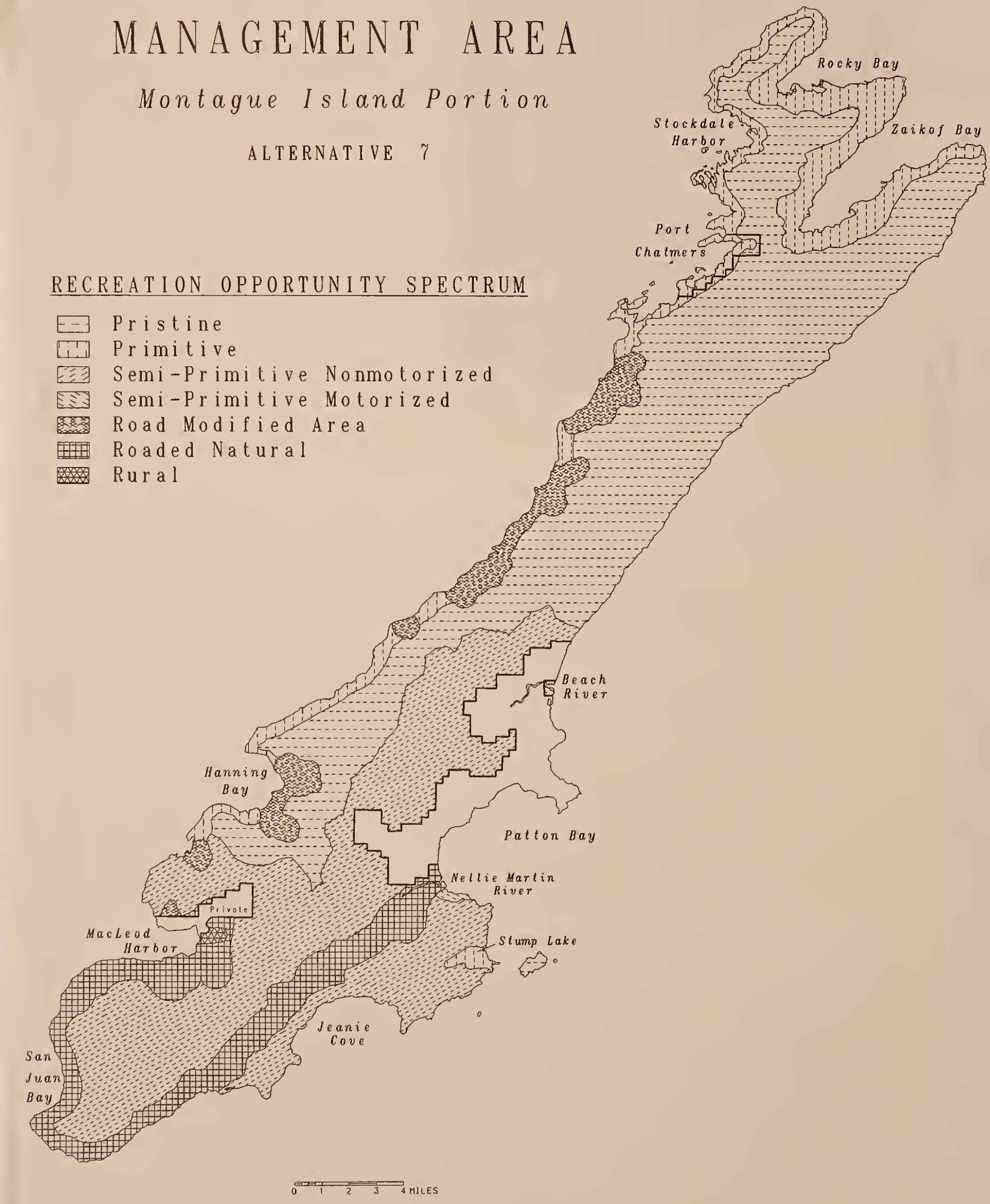
MAP 24

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

ALTERNATIVE 7



MAP 25

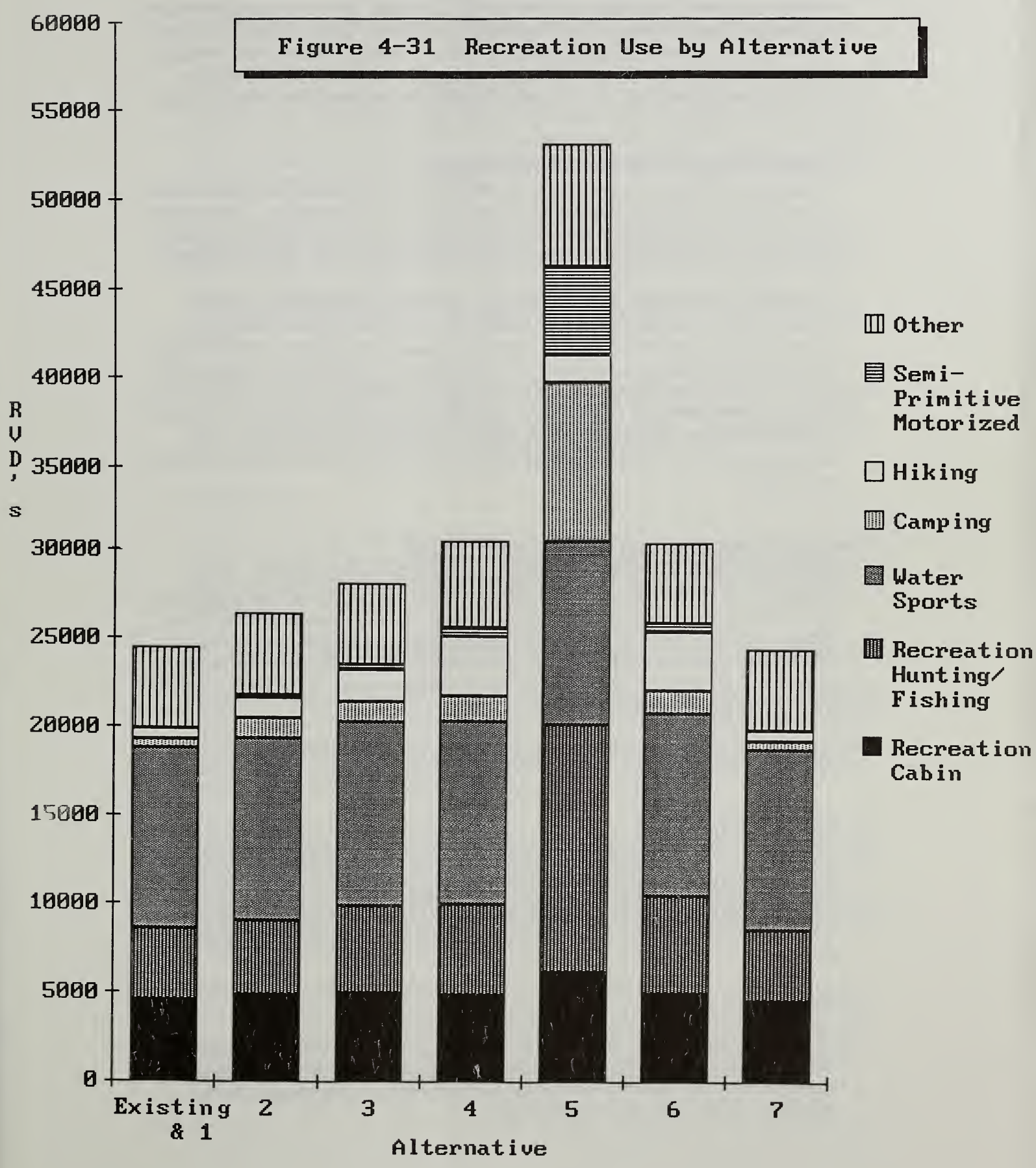
Estimated recreation use, as a result of proposed actions, were calculated for facilities and projects, such as new recreation cabins and trails. Recreation use from project proposals were summarized by activities (Figure 4-31). In addition, increased recreation use was calculated as a result of other proposed activities such as the improved access, expansion of overnight lodging at MacLeod Harbor, an ATV rental operation and boat dock facility for 60 passenger boats. Use increases were not calculated at full capacity of the facility, but rather at the expected use levels based on professional experience, expected use seasons, usable area, known access points, history of weather conditions and other factors specific to the management area.

Changes in recreation use for the Big Islands Management Area ranged from increases of 8 percent in Alternative 2 to more than 100 percent for Alternative 5. (See each individual alternative for more detail.) An estimate of current use on south Montague Island is 12,600 RVD's. On south Montague Island only, Alternatives 2 through 6 would result in increases in recreation use of about 13 percent, 26 percent, 47 percent, 218 percent and 46 percent, respectively.

Current recreation visitor use is relatively light in comparison to the most heavily used areas of the Chugach National Forest. The estimated increase in recreation use is fairly moderate except for Alternative 5. When visitor use increases in an area which was previously undeveloped, there is the potential for resource degradation. Potential impacts from increased visitor use include improper disposal of human waste, minor soil compaction in non-beach camping areas and increased litter (eg. cans, bottles, food, game animal parts, and general trash). Mitigation for these potential impacts as well their effectiveness are described in Chapter 2.

Potential soil erosion and degradation of stream quality as a result of new trails should be minimal to none if standards and guidelines for trail construction and maintenance are adhered to. Trail construction standards are contained in Forest Service Handbook 2309.18.

Figure 4-31 Recreation Use by Alternative



Effect of Transportation System on Recreation

As described earlier, the major effect of the transportation system is to shift from primitive to motorized recreation. The arterial road provides for Semi-primitive Motorized recreation opportunities for easy access to saltwater and connections from recreation cabins to the road. In addition, the local road systems provide for Semi-primitive Motorized recreation access to the alpine areas and some additional fishing access.

Effect of Timber Harvest on Recreation

Natural-appearing recreation settings are maintained for Hinchinbrook, Hawkins, and Green islands and the north end of Montague Island in all alternatives. The precommercial thinnings proposed in the old clearcut areas on the inside coast of Montague would not impact the recreation settings for the camping beaches used by kayakers.

The effects on the recreation setting for San Juan Bay, which includes a popular recreation cabin, vary by alternative. None of the action alternatives maintain a natural appearing recreation setting. One of the reasons for locating many of the harvest units on the hillside rather than the valley bottoms was to protect and maintain fish and wildlife habitat. Maintenance of the recreation setting (of which visuals are an integral part) would have required harvesting in less seen areas (some of those areas are valley bottoms). More detail on the effect of timber harvesting on the visual resource can be found in the visual resource section of the environmental consequences section.

Effect of Wildlife and Fisheries Activities

Most of the wildlife and fisheries activities center around maintenance of existing habitat. For the most part, these activities are highly compatible with recreation objectives since an important part of recreation on south Montague Island is hunting and fishing. As a rule, those activities which benefit wildlife populations and increase sportfishing opportunities are beneficial to recreation. As mentioned in the previous section, one exception is San Juan Bay where maintaining the visual setting conflicts with maintaining fish and deer habitat.

Prescriptions for riparian and beach fringe areas maintain recreation values.

Cumulative Effects

The effects of activities on adjacent private land are most noticeable for the proposed timber harvest in the Patton Bay area. Based on the same assumptions outlined in the wildlife section of this document, the Beach River cabin viewshed and therefore the recreation setting will be adversely affected by the planned private timber harvest activities. Effect on the wildlife/fisheries populations is detailed in the wildlife/fisheries section.

Alternative 2

The recreation prescriptions for alternative 2 provide for a Semi-primitive Motorized recreation experience in the San Juan Bay cabin area and maintain the qualities of Semi-primitive Non-motorized recreation on the rest of south Montague, namely Jeanie Cove, Stump Lake and Nellie Martin.

The major change in recreation opportunities on south Montague Island for Alternative 2 is the reduction of Pristine and Primitive acres by 60 percent, and the addition of 6,800 acres of Roaded Natural, 7,500 acres of Semi-primitive Motorized and 26,000 to Semi-primitive Non-motorized.

Recreation use levels increase by about 8 percent or 1,900 RVD's. About 25 percent is due to improved access resulting from the presence of the road from MacLeod Harbor to San Juan Bay, approximately 38 percent is due to additional developed facilities and the remainder is attributed to enhancement of dispersed recreation opportunities and rehabilitation of existing facilities.

New recreation opportunities include two recreation cabins, one at Jeanie Cove and one at Shelter Bay on Hinchinbrook Island, and an anchor buoy at Zaikof Bay. Semi-primitive Motorized recreation would be available along the new road system from MacLeod Harbor to San Juan Bay. The result is an increase of about 20 percent in the amount of national forest system lands on south Montague Island accessible to visitors.

Timber harvest units were selected along the road from MacLeod Harbor to San Juan Bay and on the slopes viewed from the new location of the San Juan Bay recreation cabin. Therefore, a natural-appearing setting is maintained on only one hillside, the north side. Two key recreation complexes are not affected.

Alternative 3

The effect on the key recreation complexes is the same as that for Alternative 2 except that the adverse effect on the San Juan Bay area is more severe and there is an increase in the amount and type of additional recreation opportunities offered at San Juan Bay.

The changes in recreation opportunities are similar to those described for Alternative 2.

Recreation use levels increase by about 15 percent or 3600 RVD's. About 13 percent is due to improved access resulting from the presence of the road from MacLeod Harbor to San Juan Bay, about 25 percent due to increases in fishing and hunting opportunities, and approximately 60 percent is attributed to additional developed facilities and the enhancement of dispersed recreation opportunities.

Additional recreation opportunities include those mentioned for Alternative 2, new fishing and hiking opportunities in the MacLeod Harbor and at San Juan Bay areas, a tent platform at San Juan Bay and three locations for saltwater access facilities. Four-wheel-drive and ATV opportunities are increased along the proposed road, particularly in the San Juan Bay area. Access to national forest land on south Montague Island is increased by about 30 percent.

Timber harvest units were selected to avoid key wildlife and fisheries habitat in San Juan Bay, but this resulted in adverse impacts to the viewshed and the recreation setting. Alternative 3 results in the greatest impact to the visual resource because both hillsides visible from the recreation cabin include the greatest number of harvested acres. This is described in more detail in the visual resources section.

Alternative 4

The recreation prescriptions provide a Semi-primitive Motorized recreation experience in the San Juan Bay cabin area and maintain the qualities of Semi-primitive Non-motorized recreation at Stump Lake and Jeanie Cove and in the immediate area of the Nellie Martin River cabin.

The major change in recreation opportunities for south Montague Island is the reduction of Pristine and Primitive acres by 93 percent and the addition of about 20,000 acres of Roaded Natural and 7,100 acres of Semi-Primitive Motorized recreation. As mentioned earlier in the Common to Alternatives section, this can be put in perspective by looking at the entire management area and all of Montague Island. For this alternative, there are just over 50 percent of the total acres in Pristine and Primitive for the entire management area and about 64 percent of Montague Island is in Pristine and Primitive.

Recreation use increases by about 25 percent or 6,200 RVD's. About 35 percent of this increase is attributed to the arterial road, 19 percent is due to improved hunter access to alpine areas and the remainder are increases as a result of additional facilities including recreation cabins, tent platforms and trail construction.

New recreation facilities include those indicated for Alternative 3 and the following facilities in three key recreation complexes: Jeanie Cove (two recreation trails), Nellie Martin River (two tent platforms) and Stump Lake (two recreation trails connecting Stump Lake to the Nellie Martin River area and the arterial road). Four interpretive sites are proposed near fish habitat enhancement projects and near timber harvest units in riparian areas to interpret multiple resource management.

The proposed transportation system increases opportunities for Semi-primitive Motorized recreation from MacLeod Harbor to Patton Bay and increases the amount of National Forest system lands accessible to visitors to about 70 percent for south Montague Island.

Key recreation complexes at Nellie Martin River, Stump Lake and Jeanie Cove would not be impacted by timber harvest. For San Juan Bay, the negative effects would be slightly less than for Alternative 3 and more than those in Alternative 2.

Alternative 5

This alternative expands recreation services and facilities on south Montague Island more than other alternatives and involves the greatest change from the existing condition.

Changes in the acres of each ROS Class for Alternative 5 are very similar to those shown for Alternative 4 (Figures 4-29 and 4-30).

For the management area, recreation use would increase by about 115 percent or 28,630 RVD's. About 60 percent of this increase is attributed to expanded and additional overnight facilities at MacLeod Harbor, most of which would be accomplished through a partnership between the Forest Service and the private sector. Forthy-three thousand RVD's, or 15 percent of the increase, is attributed to the new road and the remaining 7,500, or 25 percent is expected as a result of the new recreation facilities.

The total increase sounds quite large but that is only relative to the rather low use occurring now.

The estimate for increase in use due to new facilities did not assume full capacity (see Common to Alternatives section for discussion of this calculation). Most of the increased use is expected to occur on or near the facilities provided, i.e. trails, roads, campsites, lodge facilities, in the MacLeod Harbor to San Juan Bay area. Those facilities would include site hardening (extensive barrier work, etc.) where appropriate and would be constructed to a standard capable of handling the expected visitor use without adversely affecting the physical environment. A few areas of non-motorized use would involve barriers such as gates to prevent motorized use. These areas are designated in the transportation section. Some areas are expected to require barriers but the exact locations will be delineated during the construction phase. An example is the non-motorized lateral ridge trail where it joins the ATV trail.

Recreation opportunities are greatly increased under this alternative, and existing facilities are enhanced. Additional recreation cabins and tent platforms are added in response to the unfulfilled demand for this recreation opportunity. Hunter access to alpine areas is improved through the construction of short trails beginning at the end of local roads. Anglers access is enhanced through the construction of angler trails from the ends of roads to streams. The amount of National Forest System land on south Montague more accessible to visitors is increased to 85 percent.

New recreation opportunities in Alternative 5 would be implemented through new Forest Service construction and also through partnerships. Projects likely to be Forest Service constructed facilities would include all the facilities proposed in Alternative 4 plus a 20-unit campground (with shelters) at MacLeod Harbor, three recreation cabins in the upper reaches of the Nellie Martin drainage and at least two and possibly three additional recreation cabins on the north end of Montague.

Other projects include expanding the overnight facilities in the MacLeod Harbor area and permitting other services such as ATV rentals, food and fuel sales/services, tour boat operations, flightseeing trips, and outfitter/guide operations including fishing and backpacking trips. Depending on the outcome of the feasibility study, the wheeled landing strip at MacLeod Harbor could be improved and maintained by private interest(s).

Traffic levels would be monitored to ensure that the road system can safely handle the additional recreation traffic as well as logging traffic. Once additional overnight lodgings are provided, the proposed projects designed to provide a recreation destination on southeast Montague Island would be initiated. These include the ATV trail from MacLeod Harbor to the connection with the arterial road in the upper reaches of Nellie Martin drainage, the lateral foot trail along the ridgeline from San Juan Bay to MacLeod Harbor and the interpretive facility for cultural resources at San Juan Bay.

There is the potential for conflict between the recreation traffic and logging traffic. This alternative predicts the largest increase in use, about 5,000 RVD's of Semi-primitive Motorized recreation on an annual basis.

Alternative 6

This alternative is similar to Alternative 4 in many respects with the major exception being the roading of the Jeanie Cove area. The similarities to Alternative 4 are in the

effect on most key recreation complexes, the amount and location of new development and in the new recreation opportunities being offered. The difference is in the Jeanie Cove area which would not be maintained as Primitive recreation since the road will extend to the beach and some harvest units will alter the natural setting.

The major change in recreation opportunities on south Montague Island is the reduction of Pristine and Primitive acres by 95 percent (28,400 acres to Roaded Natural and 4,700 acres to Semi-primitive Motorized). Again, this may be put into perspective by considering the entire Management Area in which case the reduction is about 40 percent.

Recreation use increases by about 25 percent or 6,100 3VD's. About 35 percent of this increase is attributed to the arterial road, 19 percent is due to improved hunter access to alpine areas and the remainder are increases as a result of additional facilities including recreation cabins, tent platforms and trail construction.

New recreation opportunities are similar to those shown in Alternative 4 except for the Jeanie Cove area which has motorized access as well as additional spur roads and foot trails. About 75 percent of National Forest system land is more accessible.

Alternative 7

The major effect on the recreation resource for this alternative would be the shift from a roadless area to a roaded natural setting on south Montague. No management prescriptions are applied in Alternative 7. The effect on the key recreation complexes would be that the natural setting in San Juan Bay would be altered from Primitive to a Semi-primitive Motorized setting. However, no new recreation opportunities would be offered since the road will not be open to the public. The qualities of Semi-primitive Non-motorized recreation would be maintained at Stump Lake and Jeanie Cove and in the immediate area of the Nellie Martin river cabin.

The major change in recreation opportunities for south Montague is the reduction of Pristine and Primitive acres by 93 percent, and the addition of about 20,000 acres of Roaded Natural and 7,100 acres of Semi-primitive Motorized recreation. As mentioned earlier in the Common to Alternatives section, this can be put in perspective by looking at the entire Management Area and all of Montague Island. For this alternative, there are just over 50 percent of the total acres in Pristine and Primitive for the entire management area and aobut 64 percent of Montague Island is in Pristine and Primitive.

Recreation use will not change from the current condition as a result of proposals in Alternative 7.

No new recreation facilities are proposed.

The proposed transportation system does not offer any new opportunities to the recreating public.

Key recreation complexes at Nellie Martin River, Stump Lake and Jeanie Cove would not be impacted by timber harvest. For San Juan Bay, the negative effects of the timber harvest units on the recreation setting would be confined to the area of the road location as viewed from the recreation cabin in its current location.

Visual Resources

General Effects

The basic effects upon the visual resource from implementing any of the action alternatives is a decrease in the degree to which the landscape appears to be natural and an increase in the degree to which it appears to be altered by humans. The visual condition levels I--VI (see Figure 3-5) are used to define the balance between natural and altered features in a landscape's appearance. The effects of implementing the alternatives are tracked by charting the changes in the acreages in each visual condition level. The general results are a decrease of acres in visual condition levels I and II (landscapes with natural appearances) and an increase of acres in levels III, IV, and V (landscapes with evidence of man-made alterations). Thus the action alternatives would all, to varying degrees, lessen the composite natural and roadless character of the viewsheds containing proposed activities. Those future visual conditions (FVC's) can be compared to the two landscape management baselines, the adopted visual quality objectives (VQO's), which set standards for how much alteration is acceptable in a landscape, and the existing visual conditions (EVC's), which tell how much alteration is currently visible in the landscape, to assess the magnitude of the changes for each alternative.

Besides changes in visual conditions, another result of management activities would be the creation of new viewpoints, use patterns, and use levels. Construction of new cabins, roads, trails, and other recreation facilities would generate new use that could change the inventoried sensitivity levels, seen areas and inventoried VQO's. A new visual resource inventory will be deferred until the forest plan is revised. For this analysis, VQO's are retained in their current configuration. Because VQO revisions were not proposed as part of alternative formulation, the consequences of the other proposed resource management activities would not always be in keeping with the requirements of the adopted VQO's. Although new VQO's were not proposed for the arterial road corridor, this analysis will note visual condition changes that could be seen from along the potential road locations.

The analysis focuses upon changes to the scenic quality of Montague Island and, in particular, upon changes to the south end of Montague. Activities proposed for the remainder of the management area are much less significant in terms of both the quality and quantity of change in the landscape's natural character. The discussion also centers on the near-term effects of the alternatives. General long-term consequences are addressed under a separate heading. Unless otherwise noted, data only applies to national forest land. Combined effects upon the entire land base of the management area, including private land, are discussed in the Cumulative Effects section.

Short-Term Effects

Recreation facility developments are generally alterations that affect relatively few acres to a relatively slight degree. One recreation cabin would be added at Shelter Bay (on Hinchinbrook Island) under Alternatives 2 through 6. The remainder of the recreation developments that would have appreciable visual resource consequences would be located on Montague Island. Standard practice in cabin development is to select a relatively inconspicuous site in which the cabin would not dominate a large

natural setting. It is estimated throughout the analysis that construction of each new cabin would result in five acres being converted to FVC III (landscapes, though predominantly natural, that would have clear evidence of man-made alterations). Tent platforms, tent pads, saltwater access points and shelters are also each estimated to change an area five acres in size to FVC III.

Since the trailhead parking areas proposed as part of Alternatives 3-6 would be located within landscapes also altered by timber harvesting and roading, they would cause no additional landscapes to change in visual condition.

Construction of trails for nonmotorized use was assumed to leave the landscape with a natural appearance (FVC II). Thus, except in untouched, Pristine landscapes (visual condition I), the trails were estimated not to impart any further visual resource consequences. For example, in Alternatives 3-6, portions of the trails around San Juan Bay, the Nellie Martin River and Stump Lake would be located in landscapes that are currently or would be disturbed anyway and thus would not be noticeably changed by addition of the trails.

Two types of recreation facilities would only be developed under Alternative 5. The motorized trail over the crest of the island would create greater landscape alteration than the non-motorized trail because of the additional width, grading and ground disturbance that would be associated with its construction and because of the steep, open ground it would traverse. Consequently, a relatively broad, 200 feet-wide strip would be converted to FVC III. The other recreation facility exclusive to Alternative 5, the campground located around the southeast corner of MacLeod Harbor, would dominate 40 acres that would thus be altered to visual condition IV.

In total, new recreation facilities proposed in Alternatives 2 through 6 would add additional landscape alterations from 20 acres in Alternative 2 to 450 acres in Alternative 5. Alternative 7 would develop no recreation facilities; thus recreation facilities would create no new landscape alterations under this alternative. The motorized trail found solely in Alternative 5 would be the recreation development that would create the greatest qualitative and quantitative landscape modification. It would noticeably affect more acres (170) than any other recreation development and lower the visual condition of largely Pristine, untouched mountainsides and ridgetops visible from a wide number of locations around MacLeod Harbor and San Juan Bay. Nonetheless, the effects of the trail would generally comply with the applicable Partial Retention VQO.

Recreation development would cause very little acreage to not meet VQO requirements. The MacLeod Harbor campground, which would be constructed only in Alternative 5, would cause more (10) acres to deviate from retention VQO's than any other proposed recreation development. The new San Juan Bay cabin location common to Alternatives 3 through 6, the MacLeod Harbor boat ramp, and the Nellie Martin tent platforms and shelters would each alter about an acre of landscape slightly more than is appropriate under Retention standards. The trailheads above the east end of MacLeod Harbor and the north and south sides of San Juan Harbor would all impact small areas in Partial Retention landscapes sufficiently to deviate from VQO direction by one level also.

Alternative 5 would have the most acres not meeting VQO's because of recreation development; 17 acres would actually be altered beyond the thresholds specified by retention or partial retention direction. At the other end of the recreation development spectrum, Alternative 2 would create two acres of noncompliance in the course of

providing recreation facilities. Since Alternatives 1 and 7 would construct no new recreation facilities, recreation development would create no acres in noncompliance with VQO's.

The cumulative effect of all harvest units and their associated transportation systems that would occur under Alternatives 2 through 7 would create the greatest qualitative and quantitative changes in visual conditions of all the proposed management activities. Construction of the arterial road would be common to Alternatives 2 through 7. Alternatives 2 through 6 would also develop an additional transportation system associated with timber and other resource management. While the visual consequences of roading would be less than those of timber harvest units, they still contribute notably to the overall visual resource consequences of the affected viewsheds.

While it will often be an alteration that is noticeable, the arterial road would generally not be a dominant intrusion into the landscape. As such, it would normally create a visual condition level III corridor that would meet Partial Retention when seen from sensitive viewpoints. Much of the road would, however, fall within Rentention zones around the shorelines of MacLeod Harbor and San Juan Bay. In those areas, about 36 acres would have noticeable alterations and would therefore not meet the requirements of the Retention VQO (which requires that alterations not be noticeable). This effect would be common to Alternatives 2-7.

Since Alternative 7 would harvest no timber on national forest land, it would produce the least landscape alteration of all the action alternatives; the arterial road would be the sole national forest landscape modification under this alternative.

Log transfer facilities (LTF) are a development associated with timber harvesting activities that would also generate landscape modifications. Each of the four alternative locations would have vegetative clearing, earthwork, and surfacing associated with the construction of the necessary ramps, pads and log storage areas. The ramp and turnaround pad associated with LTF would be the most prominent portions of the sites because of their greater exposure to more viewpoints in and around the water. Approximately 12 to 15 acres would actually be modified at any of the potential sites. There would be some slight variation in the visual resource consequences of the four sites but they would all basically dominate about a 50 to 60 acre portion of beach landscape and convert it to FVC V (major, very dominant landscape dusturbances) during operations and FVC IV (dominant disturbances) after operations. All of the proposed locations are within sensitivity level 1 landscapes and would be visible from numerous locations around the affected waterbodies. Only two sites, south MacLeod Harbor and Wooded Island, are on national forest land and therefore have adopted VQO's.

The LTF site on the south side of MacLeod Harbor is in a Retention area. Relative to the north side site, it would have a longer ramp with a higher profile in comparison to the adjacent ground. Thus, it would create a slightly more visible alteration of the landscape. It would still produce a landscape within the range defined by FVC IV, two visual condition levels of alteration greater than the FVC II needed to meet Retention. The A-frame facility design option for this site would create a higher profile landform modification than would the ramp-slide option but it would not be a sufficiently greater impact to give it a different FVC designation. During operation, the A-frame facility located prominently on the end of the ramp would be appreciably more visible than the ramp-slide operation.

The Wooded Island LTF site is also in a Retention area. Because of the gentle grades off the coast, it would require the longest ramp of all the potential sites and the construction of a breakwater between Montague Island and Wooded Island. Neither landform would have a particularly high profile, however; the difference between this and the other sites would be more in terms of slightly more area impacted rather than an appreciable qualitative difference in visible impacts. Thus this alternative would produce about 5 more acres converted to FVC IV than would either of the MacLeod Harbor sites.

More significant than the variations between the sites would be the number of these LTF sites that would be developed under the various alternatives. Alternatives 2 and 3 would require three facilities--both sides of MacLeod Harbor and Box Point--while Alternatives 4, 5 and 6 would only use the north MacLeod Harbor site. Alternative 1 would likely require two sites, the north side of MacLeod Harbor and Box Point. Alternative 1 would generate about 105 acres of FVC IV landscape dominated by LTF modifications. Alternatives 2 and 3 would have about 160 acres of FVC IV. Alternatives 4 through 7 would have about 60 FVC IV acres from LTF development.

For Alternatives 2 and 3, about 12 acres on the south side of MacLeod Harbor would not meet VQO definitions due to LTF modifications. The sites associated with Alternative 1 and Alternative 4 through 7 would be on private land and do not have applicable VQO's.

Fish habitat enhancement projects are also planned as part of all the action alternatives. The most significant landscape disturbances would be associated with projects under consideration for MacLeod Harbor, San Juan Bay and Strike Creek. In total, 30 acres would actually be altered in these three projects. While these projects would modify the landscape (generally to FVC III) and while some of the stream channel projects would lower visual conditions (to II or III) over small areas, the overall visual resource consequences of fish enhancement projects are both qualitatively and quantitatively small in comparison to those of timber harvest activities. The two fisheries projects that would create the biggest disturbances, MacLeod Harbor and San Juan Bay, are common to Alternatives 2 through 6. Of the remaining smaller impact projects, Alternatives 2 and 3 propose fewer projects than Alternatives 4, 5 and 6. Thus fish habitat enhancement projects would be expected to reduce the natural character of Montague Island slightly more under Alternatives 4, 5 and 6 than under Alternatives 2 and 3. In the context of the entire island and the other proposed management activities, these alterations are relatively minor. The difference in modification levels between the two groups of alternatives is relatively slight as well. (No landscape modifications related to fisheries projects would occur under Alternatives 1 and 7.)

Since the main landscape changes (from timber management activities and roading) would occur on the south end of Montague, recreation customers visiting that portion of the island would be the primary user group that would be affected. Hunters, anglers, campers, kayakers and other visitors to the harbors, cabins or new recreation facilities could see these new alterations. No alternative would create landscape alterations perceptible from the Alaska Marine Highway, cruise ship routes, or populated areas around Cordova. Thus, while sensitivity level 1 landscapes would be impacted in all the action alternatives, areas seen from the most important viewpoints with the highest visitation in and around the management area would not be affected by national forest management activities.

Two sensitivity level 1 viewsheds would be affected by management activities on national forest land in all action alternatives. Both MacLeod Harbor and San Juan Bay would have some level of landscape alteration in those alternatives. Two other sensitivity level 1 viewsheds, Patton Bay and Beach River, in addition to MacLeod Harbor, would be impacted by anticipated private land management activities.

Changes in visual condition levels are displayed in Figure 4-32a. Current acreages in each condition level (existing visual conditions) can be compared to those conditions expected to result from implementation of each alternative (future visual conditions).

Acres for the entire management area are displayed in Figure 4-33 A. Acres for Montague Island only, where the vast majority of the landscape alterations would occur, are shown in Figure 4-32 A.

Based upon the data used to formulate the Figure 4-32 A, Figure 4-33 lists the number of acres where the visual condition would decline (become less natural in appearance) subdivided by the number of levels of visual condition decline. More levels of change mean more extreme impacts.) Thus it gives an indication of the magnitude as well as the quantity of visual condition changes that would result from proposed management activities. Alternative 6 would generate the most acres whose appearance would become less natural.

Since visual condition levels quantify degrees of natural landscape appearance, the effects upon the natural character of the management area can be extracted from the data in Figures 4-32 A, 4-32 B, and 4-33. Acres that would retain a pristine or natural appearance after implementation are listed in FVC levels I or II respectively. Thus, the tables show that after implementation, the natural character of the landscape would remain intact over the vast majority of Montague Island. Considering only national forest management activities and the national forest island, the percentage of the land base that would be natural-appearing would range from 97.8 percent in Alternative 1 (which would maintain the status quo) to 93.4 percent in Alternative 6.

Since little appreciable change would occur to the remainder of the management area under any of the alternatives, and since their current character is largely natural in appearance, the proportion of the entire management area that would have a natural appearance would be even higher than the aforementioned percentages. The variation between the alternatives would range from Alternative 1, which would maintain the current proportion of 98.5 percent of the entire management area appearing natural or untouched, to Alternative 6, which would lower that percentage to 95.7 percent. Alternative 7 would maintain the natural character of a higher proportion of the management area than any other action alternative. (97.5 percent).

Figure 4-32A Future Visual Condition (FVC) for National Forest Land in the Big Islands Management Area

		ACRES BY ALTERNATIVES						
FVC	EVC	1	2	3	4	5	6	7
I	288,897	288,897	284,312	282,742	283,312	282,828	282,147	287,464
	92.0%	92.0%	90.6%	90.0%	90.2%	90.0%	89.8%	91.5%
II	20,312	20,312	19,577	19,574	18,547	18,648	18,587	18,728
	6.5%	6.5%	6.3%	6.2%	5.9%	5.9%	5.9%	6.0%
III	3,870	3,870	4,975	5,590	7,650	8,249	7,755	6,877
	1.2%	1.2%	1.6%	1.8%	2.4%	2.6%	2.5%	2.2%
IV	852	852	4,220	6,052	3,002	3,333	4,582	852
	0.3%	0.3%	1.4%	1.9%	1.0%	1.1%	1.5%	0.3%
V	110	110	110	110	1,450	1,330	970	110
	.04%	.04%	.04%	0.4%	.05%	0.4%	0.3%	.03%
VI	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%

NOTE: Only changes in visual conditions that would result from management activities on National Forest System land are displayed in the figure above. (Figure 4-36A in the Cumulative Effects subsection shows how activities on both National Forest and private land would affect both National Forest and private lands.)

Figure 4-32B Future Visual Condition (FVC) for National Forest Land on Montague Island

		ACRES BY ALTERNATIVES						
FVC	EVC	1	2	3	4	5	6	7
I	173,174	173,174	168,590	167,020	167,590	166,785	166,425	171,751
II	13,207	13,207	12,473	12,448	11,448	11,528	11,488	11,623
III	3,332	3,332	4,432	5,047	7,107	7,702	7,212	6,339
IV	786	786	5,006	5,986	2,936	3,266	4,516	786
V	0	0	0	0	1,420	1,220	860	0
VI	0	0	0	0	0	0	0	0

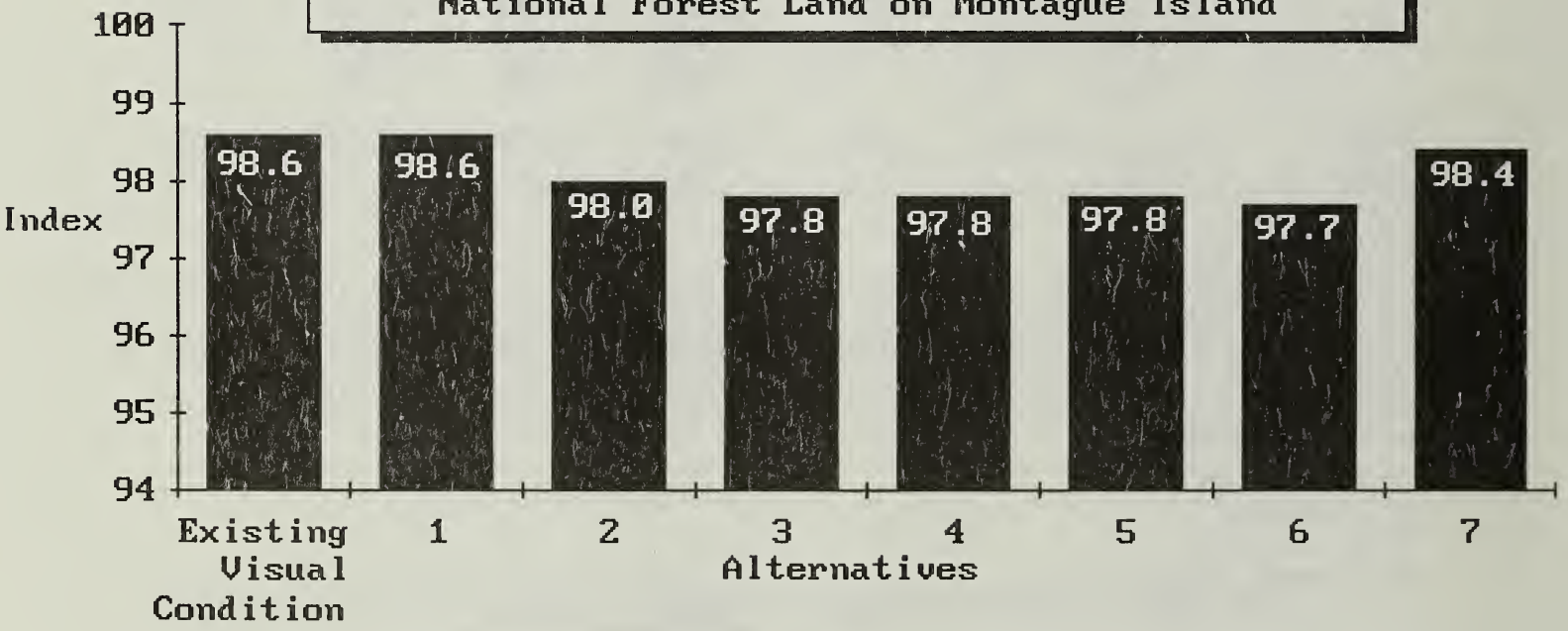
Figure 4-33 Acres declining in Visual Condition by levels of decline resulting from activities on National Forest System land on Montague Island

	ALTERNATIVES						
	1	2	3	4	5	6	7
Levels of Decline							
1	0	365	240	1,800	2,130	1,840	1,584
2	0	1,465	2,085	2,155	2,690	2,310	1,423
3	0	3,610	4,620	2,150	2,330	3,590	0
4	0	0	0	1,340	1,220	960	0
TOTAL ACRES	0	5,440	6,945	7,445	8,370	8,530	3,007
TOTAL as Percentage of Montague Island National Forest Land	0%	2.9%	3.6%	3.9%	4.4%	4.5%	1.6%
TOTAL acres declining in visual condition as percentage of all National Forest Land in Management Area	0%	1.7%	2.2%	2.4%	2.7%	2.7%	1.0%

Visual quality indexes (VQI's) for each alternative are plotted in Figure 4-34. By comparing these indicators of composite scenic quality for Montague Island, one can see the limited difference between the alternatives and the current situation (EVC).

Alternative 1 would maintain that current level of scenic quality; VQI's for the action alternatives all show slight declines in scenic quality because of a degree of loss of natural character.

Figure 4-34 Visual Quality Index (VQI) for National Forest Land on Montague Island

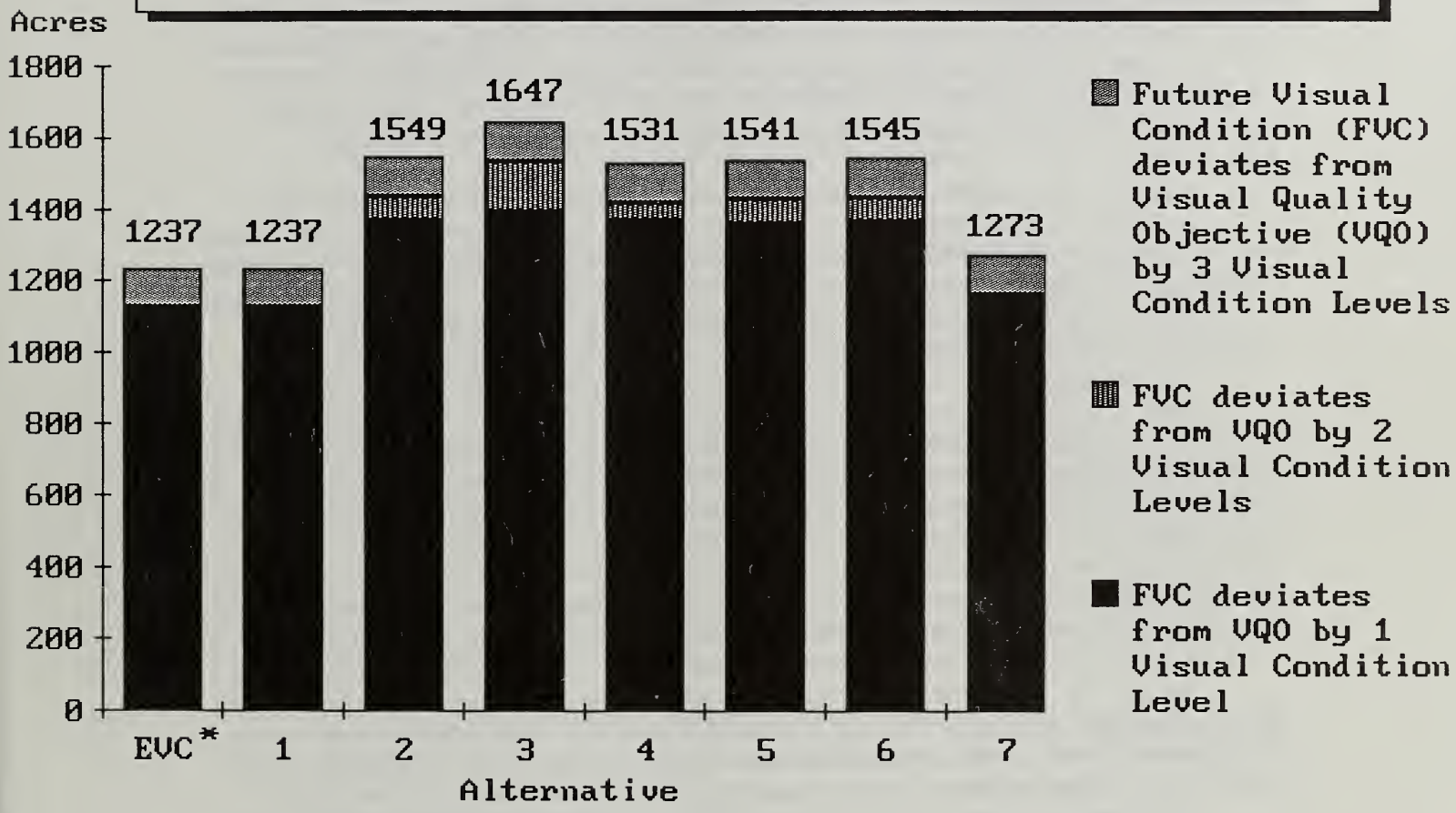


If the VQI is 100, then the entire management area is pristine. (100% of area is Visual Condition 1)

If the VQI is 30.3 then the entire management area is drastically altered. (100% of the area is Visual Condition VI)

By comparing the expected FVC's to the adopted VQO's, the number of acres not expected to meet VQO's can be calculated. Figure 4-35 displays this data subdivided by the number of visual condition levels by which the acres would not meet the VQO direction. The number of levels indicate the magnitude of the deviation. The total number of acres not meeting VQO's under each alternative constitute the total visual resource rehabilitation need associated with that alternative.

Figure 4-35 Visual Quality Objective (VQO) Noncompliance



Existing Visual Condition

Note: Acres listed for Alternative 1 are primarily the results of prior timber harvests where the inventoried EVC does not meet the adopted VQO's. Those acres are also shown under Alternatives 2-7.

The acres shown represent the areas that have been or would be modified by management activities.

They do not include acreages for adjacent areas within viewsheds whose overall visual condition would no longer meet the applicable VQO's (ie. San Juan Bay Viewshed.)

Short-Term Effects

Alternative 1. No major development activities would be undertaken on national forest lands. Consequently no major changes in visual condition would occur. Natural rehabilitation of existing landscape modifications during the period under analysis would not be sufficient in this or any of the alternatives to noticeably raise visual condition levels. Thus the average forest visitor would not notice any appreciable changes to the national forest landscape of Montague Island or the rest of management area.

Because the national forest landscape would not appreciably change, the visual quality indexes for the national forest lands in the management area in total and on Montague Island in particular would also remain at their current index levels, 98.6 and 98.4, respectively. Thus, this alternative would maintain higher (more natural) overall visual quality than would any of the action alternatives. This difference in visual quality between the no action and action alternatives would only be noticeable on Montague Island. The visual resource consequences of all the alternatives would be virtually nonexistant for the remainder of the management area under all alternatives.

Alternative 2 would maintain the existing visual condition (EVC) on 98.3 percent of acreage in the management area and would reduce the visual quality on the remaining 1.7 percent. For Montague Island alone the current visual quality would be maintained on 97.1 percent of the acres and would decline on 2.9 percent. The percentages listed here and in the text describing the other alternatives refer to the effects of management activities on national forest land only. The overall visual quality of this alternative, measured by the visual quality index (VQI), is the highest of the action alternatives. For the management area as a whole, the VQI would drop from its current index level, 98.6 to 98.0. Looking at just the Montague Island landscape, the VQI would decrease from its current index level, 98.4 to 97.4. For reference, a totally Pristine, untouched landscape would have a 100 VQI of 100; if all national forest lands on Montague Island were drastically altered, the resultant VQI would be 30.4.

Alternative 2 would concentrate management activities and therefore landscape alterations to the portion of Montague Island between MacLeod Harbor and San Juan Bay. National forest lands on the east side of the island would retain their currently natural appearance. A general comparison to the other action alternatives reveals that visual resource impacts would be relatively heavy around MacLeod Harbor and west to the vicinity of Point Bryant and relatively light around San Juan Bay. Activities around the head of MacLeod Harbor would produce visual conditions between levels III and IV, which would marginally exceed the acceptable levels of alteration defined under the Partial Retention (PR) VQO for the area. See Chapter 3, Figure 3-14, for an illustration of the visual condition levels. The Partial Retention middleground area stretching from the south side of MacLeod Harbor to Point Bryant would be treated with several harvest units whose cumulative visual impacts would result in an overall FVC of level IV, which would not meet the Level III condition required by the PR VQO. This alternative would generate more landscape alterations than any other alternative in the MacLeod Harbor/Point Bryant area.

Unlike Alternatives 3 through 6, no timber would be harvested on the north side of San Juan Bay. The south side would be altered by timber management activities slightly more than in the other alternatives, though it would still fall within the same FVC IV level as Alternatives 3 through 6. Because the north side would not be affected at all, the overall visual resource consequences in the San Juan viewshed would be less than those in the other alternatives (3-6) that specify timber harvesting.

Views from the arterial road corridor in the MacLeod Harbor to Point Bryant area would be more altered under this than any other alternative because of the more concentrated activities in that area. About one and three-quarters miles of regeneration harvesting would front on the road. Several units would also be visible in the middleground. The overall condition of the viewshed would be level IV around MacLeod Harbor and III around Point Bryant. Despite the concentration of impacts in this one area, the total road corridor would have less harvest unit road frontage than under Alternatives 4, 5 and 6 simply because it would have less road length. There would be slightly more harvesting along the road than in Alternative 3.

Alternative 3. Alternative 3 would maintain the EVC on 97.8 percent of the management area acreage and would reduce visual quality on the remaining 2.2 percent of the land base. Considering Montague Island alone, the current visual quality would be retained on 96.4 percent of the acres and would decline on 3.6 percent. The overall visual quality of this alternative, measured by the VQI, is in the middle of the range defined by Alternatives 1-7. For the management area as a whole, the VQI shows a drop in overall visual quality, from the existing 98.6 index to 97.8. For just Montague Island, the VQI would decrease from its current index level, 98.4 to 97.1.

In a manner similar to Alternative 2, landscape modifications would increase from current levels over a relatively limited area when compared to the other action alternatives. The southeast side of Montague Island would be left essentially unaltered. Relatively speaking, new alterations would be both intensive and extensive around MacLeod Harbor to Point Bryant and San Juan Bay.

Activities in the sensitivity level 1 MacLeod Harbor viewshed would produce FVC III to IV conditions similar to Alternative 2, noticeably more than in the other action alternatives. Again, the level 1 alterations would be localized deviations from the applicable Partial Retention VQO. Overall, the area would generally be FVC III, predominantly natural in appearance as per Partial Retention requirements. Further west toward Point Bryant, FVC IV would be the cumulative consequence of several harvest units. Overall impacts in this area would be somewhat less than in Alternative 2 because of fewer harvest units but slightly more than in Alternatives 4, 5 and 6.

Views on both sides of San Juan Bay would have new alterations ranging individually from FVC III to V. Overall, sufficient proportions of the hillsides would be modified to convert them from their current natural appearance to a visual condition IV dominated by evidence of management activities.

As in Alternative 2, a relatively short arterial road viewshed would be created under this alternative. Impacts in that corridor would be also concentrated in that stretch from the head of MacLeod Harbor to the Point Bryant vicinity. Compared to Alternative 2, two fewer units would be harvested along the road. Thus the overall visual condition would decline to level III rather than level III and level IV. Middle-ground impacts in this area would be similar to Alternative 2 and greater than the remaining action alternatives. In total, the road corridor would have less harvest unit frontage (less than one and half miles) than in any other action alternative except Alternative 7 because of the relatively short corridor length.

Alternative 4 would maintain the EVC on 97.6 percent of the land in the management area and owuld reduce visual quality on the remaining 2.4 percent. On just Montague Island, the current visual quality level would be kept on 96.1 percent of the acreage while visual quality would drop on the remaining 3.9 percent of the acres. The overall

visual quality that this alternative would produce, measured by VQI's, is in the middle of the range defined by Alternatives 1 through 7. For the management area as a whole the VQI indicates a slight drop in overall visual quality from the existing 98.6 VQI to 97.8. Considering just the visual condition of Montague Island, the VQI would decrease from its current index level, 98.4 to 97.1.

Alternatives 4, 5 and 6 would all have landscape modifications over appreciably higher percentages of the south end of Montague than would Alternatives 2 and 3. Many of these modifications would be located in sensitivity level 3 areas with Modification VQO's. Thus, relative to current inventoried sensitive viewpoints, these new alterations in the Strike Creek-Deception Creek-Nellie Martin River area would be largely unseen. Many of the alterations would, however, be visible from the proposed arterial road.

In general, Alternative 4 would create relatively light visual impacts from MacLeod Harbor to Point Bryant and moderately heavy impacts in the San Juan Bay area. Alterations noticeable from the water, beach or lodge around MacLeod Harbor would be minimal. In addition, in Alternatives 4, 5 and 6, one rather than 2 LTF's would be developed and operated in the harbor. That one LTF would be located on private land. Thus these alternatives and Alternative 1 would both have fewer cumulative landscape modifications, fewer national forest acres with landscape modifications and no acres not meeting VQO's because of LTFs. Consequently National Forest lands in MacLeod Harbor would comply with the applicable VQO's under this alternative. Harvest units 26 and 27 at the Point Bryant end of the area would produce the landscape alterations most noticeable from the water and opposite shoreline but the composite character of the viewshed would still be predominantly natural and would therefore as a whole meet the PR VQO for the Point Bryan area. Individually, unit 27 would be a dominant alteration in its immediate area (meeting only a modification VQO) and would therefore not meet the Partial Retention VQO.

Both sides of San Juan Bay would be affected. A somewhat higher proportion of the north side would have visible openings created by timber harvesting than would the south side; nonetheless both areas would be within the range of alterations defined by FVC IV. This level of landscape modification would be one level below (less natural) that specified by the PR VQO.

The newly created viewshed seen from the arterial road would include a spectrum of conditions ranging from completely natural (outside of the presence of the road) to severely disturbed. Around MacLeod Harbor, the view would be predominantly natural (FVC III) with some localized disturbances that would be heavily modified FVC V harvest (units 4 and 5). Overall, the appearance would be similar to that created by Alternative 3. As the road swings around to Point Bryant, there would not be the roadside harvest units associated with the previous alternatives and the roadside landscape would retain a natural appearance (FVC II) overall. The Strike Creek--Nellie Martin River corridor would have about 3-1/4 miles of harvest unit frontage. The individual harvest units would each be very dominant landscape elements (FVC IV to V). Over 20 percent of this portion of the corridor would have a heavily modified appearance; this level of alteration would be sufficient to give an overall heavily modified, FVC V, appearance to the Strike Creek-Nellie Martin River corridor.

Alternative 5 would maintain the existing visual condition (EVC) on 97.3 percent of the land in the management area and would reduce the visual quality on the reamining 2.7 percent of the land base. Looking of just the Montague Island landscape, the current

visual condition would remain on 95.6 percent of the acres while visual quality would be reduced on the remaining 4.4 percent. The overall visual quality measured by the VQI, would be in the lowest third of the range defined by Alternatives 1 through 7. For the management area as a whole, the VQI would drop 0.8 to 97.8. The visual quality index for just Montague Island would decrease more, from the current index level, 98.4 to 97.0, because of the greater concentration of landscape alterations on Montague Island than in the management area as a whole.

The scope of changes to the Montague Island landscape associated with Alternative 5 would be similar to those associated with Alternative 6 and slightly greater than those associated with Alternative 4. Large portions of the south end of the island would have more man-made modifications than they do now. In relation to the other alternatives that would also harvest timber, Alternative 5 would create comparatively light visual impacts from MacLeod Harbor to Point Bryant and moderately heavy impacts to the San Juan Bay area. Alterations noticeable from the water, beach or lodge around MacLeod Harbor would be minimal. As under Alternative 4, harvest units 26 and 27 near Point Bryant would produce some of the more noticeable alterations in the area. Again, unit 27 would be a dominant landscape element (FVC IV) and would therefore exceed the threshold of alterations permitted by Partial Retention by one level. And, like Alternative 4, the overall visual quality of the viewshed would be predominantly natural and would therefore meet Partial Retention for the viewshed as a whole.

Changes in the San Juan Bay landscape would be comparable to those under Alternative 4 and slightly less than under Alternative 3. While different units would be harvested in this alternative (unit 46 would be harvested in this alternative in place of units 45 and 47 in Alternative 4), the overall effect on the appearance of the north slope would be about the same; obvious man-made disturbances created by the harvest openings would change the slope from a natural-appearing landscape to a landscape dominated by the alterations (FVC IV). The effects of south slope harvest units would be identical to those in Alternative 4: somewhat less than on the north slope but still FVC IV overall. Conditions of individual treatment units would vary from FVC II for stand 58 to FVC V for unit 46. FVC III conditions are necessary to meet the PR VQO for the San Juan Bay side slopes.3

The landscape along the arterial road would be similar under this alternative to that in Alternative 4. Again, the greatest number and concentration of alterations would be in the corridor north from Strike Creek and Deception Creek. Effects from MacLeod Harbor to Point Bryant would be comparatively light; the overall visual condition of that portion of the corridor would be FVC III. Impacts would be just slightly less in this area than under Alternative 4. By treating unit 19 instead of unit 5, harvest unit frontage along the road is reduced slightly from the levels associated with Alternatives 3 and 4 and impacts are more dispersed.

Conversely, visible alteration of the road viewshed in the Strike/Deception Creek area would be somewhat greater than under Alternative 4. Approximately three and three-forths miles of road frontage would be bordered by harvest units in that area, as compared to about three and one-quarter miles in Alternative 4. Overall levels of naturalness in the viewshed would also be low (FVC V). Only Alternative 6 would generate more modifications of the landscape along the mainline road, both through this area and in total.

Alternative 6. Alternative 6 would maintain the existing visual condition on 97.3 percent of the land in the management area and would reduce visual quality on the

remaining 2.7 percent of the acres. Looking at only Montague Island, the visual condition would remain unchanged on 95.5 percent of the acres; on the remaining 4.5 percent, visual quality would be reduced. The overall visual quality of Montague Island, measured by the VQI, would be the lowest in the range defined by Alternatives 1-7. The VQI for the overall scenic quality of the entire management area would fall 0.9 to 97.7. For just Montague Island, the proportional affects would again be greater; the Montague Island VQI would drop from 98.4 to 96.9.

Landscape changes around MacLeod Harbor, Point Bryant and San Juan Bay would be essentially the same as under Alternative 5. Alteration of the proposed mainline road corridor would be somewhat greater than in the previous alternative and would be greater in total than in any other alternative. From Strike Creek to the Nellie Martin River, about one half mile more of harvest units would front on the road than in Alternative 5. Those units would be dispersed over a greater length, with more units near the Nellie Martin River end of the road and less concentration of units around Strike Creek. Given that about 25 percent of the Strike Creek to Nellie Martin River portion of the road would pass through major landscape disturbances, the overall visual condition of this section of the corridor would be that of a heavily modified landscape (FVC V) as in Alternatives 4 and 5. The extent of that disturbed landscape would extend further toward Patton Bay, however, and thereby alter some of the more sensitive land in the corridor in the proximity of the Nellie Martin River.

Alternative 7 would maintain the EVC on 99.0 percent of the land in the management area and would reduce visual quality on the remaining 1.0 percent of the acreage. On Montague Island alone, the visual condition would remain unchanged on 98.4 percent of the acreage and would decline on the remaining 1.6 percent of the island's acres. The overall visual quality, measured by the visual quality index, would be the highest of all the action alternatives. Only Alternative 1, the no action alternative, would maintain higher scenic quality and natural landscape character. The VQI quantifying overall scenic quality for the management area would correspondingly drop less than it would under any alternative except Alternative 1; it would fall from 98.6 to 98.4. As with all the other alternatives, those effects become more concentrated when only Montague Island is considered: the VQI for just Montague Island would drop to 98.1 from the current 98.4.

Compared to the other action alternatives, the landscape changes that would occur would be relatively light for all Montague Island including the high sensitivity viewsheds, MacLeod Harbor to Point Bryant and San Juan Bay. The arterial road would be the only landscape alteration that would occur under this alternative; no recreation facility development or timber harvesting or fish habitat enhancement projects would take place. Road-related alterations visible from water, beach, lodge, cabin, or use area viewpoints in those areas would be minimal; those national forest landscapes would remain unchanged except for evidence of the road in unscreened locations along the beach. Thus these viewsheds would remain predominantly natural and would comply with the Partial Retention VQO's that apply to the majority of the sensitive viewshed. Much of the road, however, falls within the retention foreground zones along the beachfront where meeting Partial Retention would be one level short of the applicable Retention VQO. As previously mentioned, these effects from the road would be common to all action alternatives in these sensitive viewsheds and received minimal discussion under the other action alternatives because, in those alternatives, they would be secondary to the effects of timber harvesting. Approximately 36 acres would not meet the retention VQO's because of the addition of the road.

The landscapes seen from the arterial road would almost all be natural or untouched in appearance. The road would be the same alignment and length as under Alternatives 4 and 5, and thus more acres would be disturbed by road construction than under Alternatives 2 and 3. But in this alternative the road would be the only unnatural intrusion into the newly created viewshed. Thus this new viewshed would be FVC II in its entirety without the alterations associated with timber harvesting found in the other alternatives. While the roadless character of south Montague Island would be lost, the natural character of these landscapes adjoining the road would be maintained.

Long-term Effects

The duration of the visual impacts generated from timber harvesting would last from 20 to 40 years. Steep areas where the harvest units would be fairly close to the viewpoints would be expected to take up to the 40-year maximum to return to a natural appearance (FVC II) and meet a retention VQO. To return to just a predominantly natural appearance (FVC III) and meet Partial Retention would take less time--15 to 20 years. The effects of harvesting in areas that are flatter and further from the viewpoints would heal faster; harvest units in those areas would meet Partial Retention in about 10 years and would appear fully natural and meet retention in 20 years. For example, the large, steep units at the west end of San Juan Bay (harvest units 45, 46 and 65) would not become fully natural in appearance for 30 years but would allow the landscape to become predominantly natural and meet the applicable Partial Retention VQO within 15 years. Since the units at the east end of the bay are seen from a greater distance and a more oblique angle, they would meet Partial Retention in 10 years. Thus areas of noncompliance with visual quality objectives would become more localized and much less widespread within 10 years. After 20 years no dominant landscape modifications would remain and compliance with the Partial Retention VQO would be achieved for the entire drainage. The harvest units on the south side of MacLeod Harbor would return to a more natural appearance faster because of the distance of the viewpoints in or across the water and because, individually, they were less visible to start with.

While many of the roadside units in the arterial road corridor are on flat terrain, their immediate proximity to the road subjects them to greater scrutiny. Slash and stumps would remain dominant elements for 12 to 15 years. After 20 to 25 years slash decomposition and revegetation would eliminate the obvious effects of harvest, and the primary remaining change would be the absence of large mature trees for an extended period. This change would only be conspicuous where it continued for long distances along the road (i.e. in Alternatives 4 and 5 in the Strike Creek area).

Landscapes disturbed by fish habitat enhancement projects would also become more natural in appearance as indigenous vegetation returns and grows over disturbed areas. In some cases, structures or landforms might remain as evident alterations for the foreseeable future but the natural character of affected areas would largely return within 10 to 15 years.

Facilities planned to remain in place on a long term basis--system roads, permanent LTFs, trails, parking areas and recreation structures, would remain as permanent landscape alterations. While vegetative growth would lessen the immediate effects of construction of these facilities soon after project completion, the basic nature of the changes described under Short-term effects would remain for the life of the structure.

Since no activities or facilities would take place or be developed under Alternative 1, only existing landscape alterations would be present. If the no action precedent were continued, the national forest landscape would evolve toward a totally natural appearance. The landscape would still change but only in response to natural forces such as wind throw, landslides, avalanches, and natural vegetative succession.

The landscape evolution under Alternative 7 would be much the same as under Alternative 1: once the arterial road was rehabilitated and revegetated, natural forces would operate to evolve the landscape toward a more continually more natural appearance.

Under Alternatives 2 through 6, future management activities can reasonably be expected to continue the precedents set by the actions proposed for this planning period. Timber management activities could continue to produce the greatest quantity and magnitude of landscape alterations and loss of the natural landscape character on Montague Island. Given current plans to place all suitable timber stands under a regulated rotation schedule for harvest, those effects would become much more widespread across the island. Only Alternatives 1 and 7, which specify no harvesting, would not set the precedent for widespread vegetative modifications.

Additional changes would also be evident in areas already affected by activities proposed by Alternatives 2 through 6: San Juan Bay and the Strike Creek corridor contain additional stands not proposed for entry in this planning period that, if harvested, would again return those viewsheds to conditions dominated by man-made modifications. In addition, stands distributed all along the west coast and around the north end of the island would cause alterations to be spread throughout those areas as they were roaded and harvested. Thus as old harvest units returned to natural appearances, new ones would be harvested on an ongoing basis. Given a relatively long period between entries, some areas could go through fairly long periods where they maintained a natural or near natural appearance but, over time, the average appearance of most of the coastal slopes and valleys around the island would include evidence or even dominance of management activities. While natural features would remain prominent parts of that coastal landscape, and while the scenic high peaks and ridgelines above the forested slopes would remain natural or even pristine in appearance, the perimeter of the island would no longer retain its current natural character. Conversely, if the no action alternative were perpetuated, the national forest lands would regain a completely natural appearance with a higher proportion of stands with an old growth character.

Landscapes with the greatest concentration of productive forest land would have the greatest probability of being dominated by management activities on a continual basis. The area between MacLeod Harbor and Hanning Bay and the peninsula north of Rocky Bay and Stockdale Harbor have the most continuous forest cover outside of areas proposed for entry this planning period in Alternatives 2 through 6. The MacLeod Harbor to Hanning Bay area is also the most visually sensitive area outside of those that would be entered this period. This portion of the coast is sensitivity level 1 (high) while the remainder of the coast north to the end of the island and around to Zaikof Bay is sensitivity level 2. While current use is relatively light along Montague's inside coast, the kayakers who visit this area have expressed particular interest in maintaining the natural character of the landscape seen from the water. This type of recreational boat traffic is growing in Prince William Sound and would be expected to increase along Montague Island also. Use of the bays and harbors would be expected to increase even more if an alternative is selected that provides new recreation

facilities in places like Rocky and Zaikof Bays. Because of this increasing use, public scrutiny of and sensitivity to landscape changes could increase.

Based upon existing VQO's, the high sensitivity middleground starting about two miles south of the Montague Lagoon and continuing around Hanning Bay down to MacLeod Harbor would join MacLeod Harbor and San Juan Bay as the landscapes most likely to be continually modified beyond the thresholds specified by their Partial Retention VQO's. The foreground strip along the coast from the lagoon around to Zaikof Bay would have deviations to its Partial Retention objective on a less routine, more localized basis.

In addition to landscape changes from continued timber management and roading, additional recreational facility development would create some further shifting towards a more man-altered landscape. If national forest timber management continues to be limited to Montague Island, recreation facilities would be the primary influence upon the remainder of the management area landscape. As with short-term effects, the consequences of recreation facilities over the long-term would still be relatively slight. Facilities would, for the most part, be small and easy to blend into their settings to keep the landscape predominantly natural. Growing recreation demand would, over time, increase the likelihood of large facility development--marinas, lodges, campgrounds--that could be dominant landscape alterations.

Fish and wildlife habitat enhancement projects would generally continue to create small, non-intensive alterations that would still leave the natural elements of the landscape as the predominant features.

In summary, long-term expectations for the management area landscapes are for the natural character of national forest land on Hinchinbrook and Hawkins islands to remain largely intact with some minor exceptions caused by additional enclaves of recreation or habitat enhancement projects. In contrast, if the type of timber management proposed under Alternatives 2 through 6 were continued, altered landscapes would become more widespread around the lower elevations of Montague Island. The viewsheds that would be the most heavily altered in the near term, those on private lands, would, however, grow more natural in appearance over an extended period until standing timber volume again made commercial harvesting economically viable.

Cumulative Effects

Alternatives 2 through 6 include timber harvest activities which would, in conjunction with road construction, habitat projects, and recreation facility construction, make the island less natural. Within the national forest landscape management system, natural appearance is a key component in scenic quality; thus the lessening of the natural character by management activities would reduce the overall scenic quality of Montague Island under all the action alternatives, including Alternative 7.

The effects to the Montague Island landscape from resource management activities on private lands are assumed to be common to all the alternatives. The cumulative effects upon scenic quality would be the existing alterations, plus the private landscape alterations, plus the sum of the alterations associated with national forest management activities. Since the first two groups of effects are basically constant to all alternatives, the main differences between the alternatives' visual resource consequences arise from the differences in national forest management activities planned under each alternative.

While the activities anticipated on private land would not vary much between alternatives (except the number and location of LTF's as discussed above), they would nonetheless generate major modifications of the landscape. The greatest changes would occur in association with timber harvesting in the Patton Bay-Beach River area and in MacLeod Harbor. Well over half of the slopes above the north face of MacLeod Harbor, the northern two-thirds of Patton Bay and most of Beach River drainage are expected to be harvested and thereby converted to a non-natural appearance. Because of their vast size, the individual harvest units would have a level IV future visual condition, a landscape in which severe disturbances contrast sharply with the natural landscape character. The consequences of these effects would cross over land ownership boundaries and affect the overall visual character of these viewsheds. Since essentially the entire Beach River area would be harvested, the character of that recreation setting would be drastically altered. Even without any additional alterations on national forest land, the natural character would be reduced.

Much of the area that would be harvested is on level terrain and therefore has a high capability to absorb visual alterations (high visual absorption capacity--VAC) without displaying noticeable evidence of those alterations. Thus, change in the landscape setting that would be evident from the national forest viewpoints would be somewhat less than what might otherwise be expected given the magnitude of landscape modification expected on private land. Consequently, in the data displayed below, the overall future visual condition of these viewsheds is shown as a decline to FVC V rather than VI. Figures 4-36 A and 4-36 B display the effects upon the natural appearance from all management activities on all lands in the management area and on all lands on Montague Island. The acres in the FVC I and II rows represent the areas that would retain a natural appearance after alternative implementation.

The range of change from the current situation on Montague Island, in which 97.8 percent of all lands are pristine or natural in appearance (existing visual conditions I or II, respectively), spans from Alternative 1, which would maintain a natural appearance over 88 percent of the island, to Alternative 6, in which 83.9 percent of the island would stay natural in landscape character. Since the appearance of the remainder of the management area would be left largely untouched, the cumulative effects upon the natural character of the entire management area would be more dilute. Alternative 6 would reduce the percentage of the entire management area land base that has a natural appearance from 98.3 percent to 90.5 percent, more than in any other alternative. Alternative 1 would again leave the highest percentage, 92.8 percent, appearing natural (future visual conditions I and II).

Figure 4-36A Future Visual Condition (FVC) for all Ownerships in the Big Islands Management Area

ACRES BY ALTERNATIVE

FVC	EVC	1	2	3	4	5	6	7
I	336,193	317,783	313,198	311,628	312,198	310,269	311,033	316,360
	91%	86.0%	84.8%	84.3%	84.5%	84.0%	84.2%	85.6%
II	26,863	25,158	24,423	24,393	23,393	23,238	23,438	23,574
	7.3%	6.8%	6.6%	6.6%	6.4%	6.3%	6.3%	6.4%
III	5,060	4,605	5,710	6,325	8,385	8,944	8,490	7,612
	1.4%	1.3%	1.5%	1.7%	2.3%	2.4%	2.3%	2.1%
IV	1,266	1,266	5,486	6,466	3,416	6,321	4,996	1,266
	0.3%	0.3%	1.5%	1.8%	0.9%	1.7%	1.4%	0.3%
V	110	20,680	20,680	20,680	22,020	20,680	21,540	20,680
	.03%	5.6%	5.6%	5.6%	6.0%	5.6%	6.8%	5.6%
VI	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%

Figure 4-36B Future Visual Condition (FVC) for all Ownerships on Montague Island

ACRES BY ALTERNATIVES

FVC	EVC	1	2	3	4	5	6	7
I	186,352	167,972	163,378	161,808	162,378	161,573	161,213	166,549
II	15,871	14,171	13,435	13,410	12,410	12,490	12,450	12,587
III	3,830	3,370	4,471	5,086	7,146	7,741	7,251	6,377
IV	786	786	5,006	5,986	2,936	3,266	4,516	786
V	0	20,570	20,570	20,570	21,990	21,790	21,430	20,570
VI	0	0	0	0	0	0	0	0

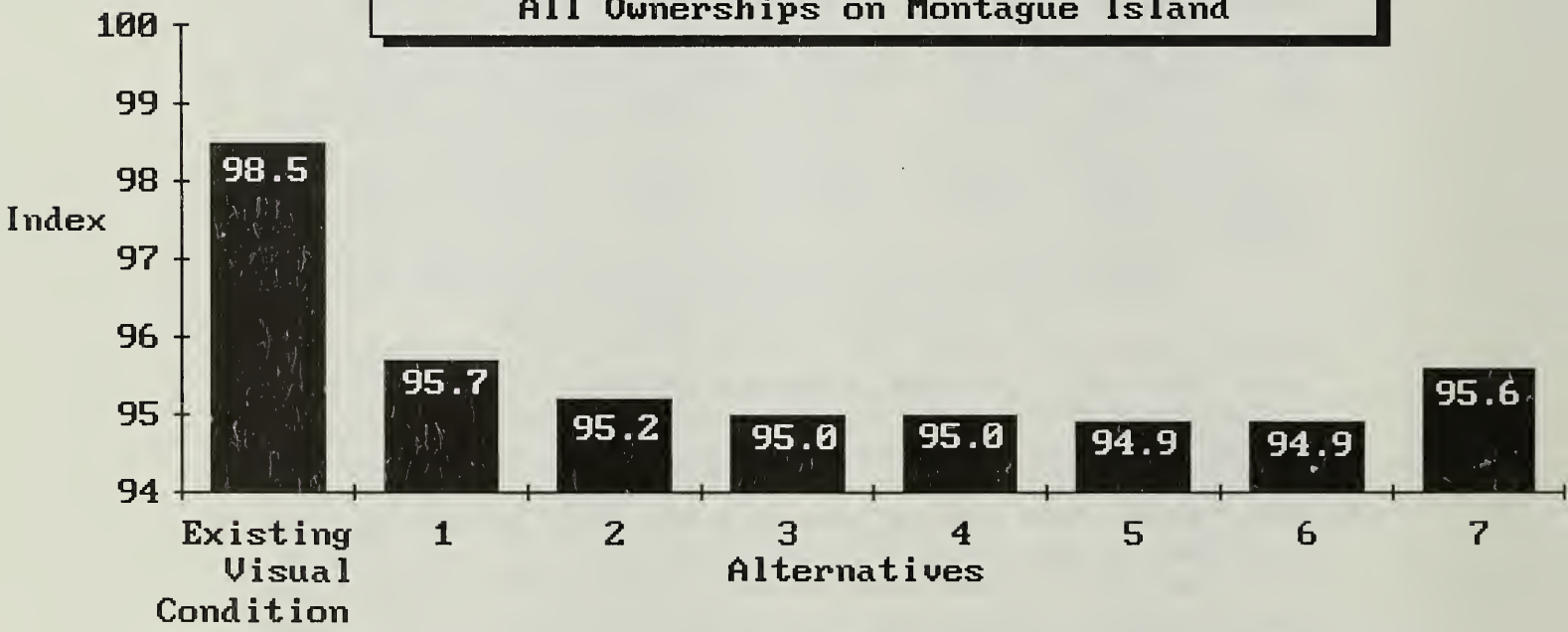
Visual Quality Indexes (VQI's) displaying the cumulative effects of each alternative upon the entire Montague Island landscape are shown in Figure 4-37. As compared to the VQI's for national forest land, Figure 4-34, these indexes indicate that:

1. Including the effects of activities on private land causes about a four-fold increase in the magnitude of change in the overall visual quality of Montague Island as compared to changes from national forest activites alone.

2. The island would still remain predominantly natural.

Figure 4-37 compares the composite scenic quality for all the alternatives through visual quality indexes that include the cumulative effects of all activities on all lands. Because these indexes include the intense effects of timber harvesting on private land, they show relatively lower visual quality ratings than does Figure 4-34, which displays ratings based solely on national forest activities and landscapes. The relative rankings of the alternatives are consistent, however; Alternative 1 shows the highest overall scenic quality and Alternative 6 shows the greatest decrease in scenic quality.

Figure 4-37 Visual Quality Index (VQI) for All Ownerships on Montague Island



If the VQI is 100, then the entire management area is pristine. (100% of area is Visual Condition 1)

If the VQI is 30.3 then the entire management area is drastically altered. (100% of the area is Visual Condition VI)

Cultural Resources

All projects listed for the Big Islands Management Area analysis alternatives, with the exception of the feasibility studies and precommercial thinning, have the potential to directly or indirectly impact cultural resources. Impacts of this kind will be avoided or mitigated by conducting appropriate cultural resource surveys prior to project implementation. The standards and guidelines for cultural resources, as set forth elsewhere in this document, spell out the procedures to be followed.

Soil and Water

Short-Term Effects

Short-term effects on the soil and water should be considered as those effects that may occur while the actual activity is taking place. The greatest potential for short-term impact is during the actual construction of facilities, roads, or during the harvesting of timber because of the continual disturbance of the soil. Transportation of sediment to the streams could be expected upon implementation of projects that disturb the vegetation or the surface organic layer to expose the mineral soil. This could be the result of either mass movements or surface soil erosion. Development of projects in the streams would likely produce short-term sedimentation, but water quality should return to before-project levels.

Timber harvest and road construction activities could all contribute to the acceleration of mass movements, soil erosion, and stream sedimentation. There is a potential for the acceleration of landslides from implementation of these activities, especially if these activities occur on active faults. These areas are often located in v-notches or on steep sideslopes adjacent to stream channels in the Jeanie Cove area, and stream sedimentation could be expected. Areas with a potential for landslides are also likely to occur as inclusions within timber harvest units that are located on slopes over 65 percent as a result of the removal of trees. These slides may also contribute sediment to the streams depending on their location. The application of best management practices (BMP's) and management area-wide standards and guidelines can reduce the potential for mass movements.

Long-Term Effects

Long-term effects on the soil and water should be considered as those effects that may occur until the disturbed environment has been completely mitigated or restored to its original state. Assuming proper construction techniques and the BMP's and standards and guidelines are used, there should be minor soil erosion from any exposed mineral soils or the road surface after heavy use has been terminated and reclamation procedures completed. Some landslides may occur in upland areas due to the original construction of the road and the removal of trees. This is especially true as a result of a major tectonic event. These slides may contribute sediment to streams depending on their location and would remove areas from vegetative productivity.

Another long-term effect from both natural and accelerated landslides from project development will be the blockage of v-notches by a mass of earth, damming up the

water in the stream and then release of this water in one large surge. These events will most likely occur at the head of canyons where they confine themselves into distinct v-notches. The force of these floods can seriously alter the hydrology of streams and the fish habitat.

A long-term effect will be the loss of vegetative productivity as a result of road or hardened skid trail development. Vegetative productivity will also be retarded significantly or eliminated in areas where landslides remove the soil. Removal of the vegetation through construction of the road may increase the productivity of the area immediately adjacent to the road because of the reduction of vegetative competition. An increase in productivity may also occur in wet soils through an increase in soil drainage, effectively lowering the water table by piling up the top soil and digging a drainage ditch during the construction of the road.

Soil and/or water pollution from surface spills or indirectly from subsoil contamination from the spilling of gasoline, oil, and the chemicals could occur from any of the proposed activities. These hazards would be expected to be small in size and localized near buildings, maintenance areas, and fueling sites.

Roadless Character

An evaluation of land suitability for preservation as wilderness was conducted for the Chugach National Forest and the record of decision for the forest plan recommended 1,703,000 acres for Wilderness designation. In addition, during the Roadless Area Review and Evaluation II (RARE II), some areas were designated as "further planning RARE II Roadless Areas", and the Big Islands Management Area was one of those areas. Under the settlement agreement requirements, the impacts of proposed management actions on roadless areas needs to be considered.

Much of the Big Islands Managment Area is considered roadless and possessing wilderness attributes, with the exception of incidental motorized use on Hinchinbrook Island. Because most of the impacts of projects are on the south end of Montague Island (discussed in detail below), the wilderness characteristics of most of the Big Islands Management Area are not affected by any of the alternatives. The exceptions are as follows, Alternatives 2, 3, 4 and 6 include a recreation cabin at Shelter Bay on Hinchinbrook Island and an anchor buoy at Zaikof Bay. Both of these facilities are designed to accomodate existing use and will not result in more than slight additional use. These two proposed actions will slightly impact the existing wilderness characteristics of the north end of Montague Island. In addition, Alternative 5 proposes a total of three potential recreation cabins and one anchor buoy on the north end of Montague Island. Taken together, these four projects would also slightly impact the existing wilderness characteristics. The greatest impact on roadless areas occurs on the south end of Montague Island under all action alternatives.

Proposed management actions which affect the wilderness characteristics of roadless areas include the proposed access developments on south Montague Island for timber, recreation and fisheries projects and the proposed recreation facilities described in Alternative 5.

The four attributes which are requisite characteristics of wilderness because they are required by the Wilderness Act are: 1) natural integrity - the extent to which long-term ecological processes are intact and operating and the degree to which an area retains its primeval natural integrity in a pure ecological sense; 2) apparent naturalness -

focuses on the importance of impacts to most visitors on the basis of perceived or apparent naturalness; 3) outstanding opportunities for solitude - considers size of area, topographic screening, vegetative screening, and human intrusions in terms of providing opportunities for solitude; and 4) primitive recreation opportunities - can be defined in terms of the types of experiences it makes possible to users. The working definition of primitive recreation is that which provides opportunities for isolation from the evidence of man, a vastness of scale, feeling a part of the natural environment, having a high degree of challenge and risk, and using outdoor skills. It is characterized by meeting nature on its own terms, without comfort and convenience facilities.

Alternative 1 does not affect the wilderness characteristics of the south end of Montague Island.

Alternatives 2 through 7 propose roads for either the southwest end or the entire south end of Montague Island. The most obvious impact on natural integrity and apparent naturalness is that wherever a road is constructed, that area can no longer be considered roadless and the natural integrity and apparent naturalness are seriously impacted. The degree to which those characteristics are affected is no longer relevant because the characteristics are no longer there and the road will be used regularly by logging traffic for the major portion of the planning period. Therefore, the most direct effect is that Alternatives 2 and 3 remove 23,600 acres from the roadless area inventory and remove remove 54,500 acres from the roadless area inventory. A small area around Stump Lake would be moderately impacted but the road would not extend physically into this area.

The opportunities for solitude and primitive recreation opportunities are also seriously impacted. For all alternatives, the result of the road is to remove most of the opportunities for primitive recreation in the affected acres. It would be difficult to experience a feeling of solitude in most of the beach areas which would be roaded as well as the remainder of the road in the upland areas. Clearly, Alternative 5 has the most impact on the largest part of south Montague Island because it contains the most development and would change the recreation experience from Primitive to Roaded Natural and Rural.

Alternative 7 would have slightly less impact on opportunities for solitude since the road would be under special use permit with the general public not being permitted to use it and there would be fewer visitors. But the overall affect of Alternative 7 would still include a serious impact.

Cumulative Effects

In addition to the national forest lands, approximately 1,500 acres of private land in the MacLeod Harbor area would be changed from roadless to roaded in Alternatives 2 and 3. Approximately 12,900 acres of private land in the Patton Bay/Beach River area, which are currently roadless, would be roaded. Alternatives 4, 5 and 6 would result in a total of approximately 68,900 acres being changed to a roaded character. Given current management direction, the loss of roadless character could continue to other parts of the management area.

Subsistence

The proposed actions and alternatives can be broken down into two broad categories: A) actions that are ground-disturbing in nature; and B) general management direction

for a piece of land and the standards and guidelines that would apply to on-the-ground activities.

The activities that could potentially impact subsistence use the most are timber management, roads, trails, and cabins.

In evaluating the effects of implementing the amended forest plan on subsistence use of resources, each alternative was evaluated against the following criteria:

The potential to reduce important subsistence fish and wildlife populations by: a) reductions in numbers; b) redistribution of subsistence resources or c) habitat losses.

The potential to restrict access.

The potential to increase competition.

1. The Potential to Reduce Populations:

Timber management has the greatest potential to reduce fish and wildlife population through habitat change. Deer winter range would be lost if harvesting took place in mature forest important for winter habitat. Fisheries habitat could be lost if improper harvesting impacted fish streams. Standards and Guidelines developed for this management area reduce the potential to lose both fish and wildlife habitat. Proposed projects in some alternatives would result in increased fish populations.

All of the timber management activities, for all alternatives, is concentrated within the south half of Montague Island. While implementing any of the alternatives identified in Chapter 2, except for the no action alternative, could reduce deer populations through habitat loss, this is not expected to have a significant impact on the subsistence resources used by residents of Prince William Sound. Any habitat loss would occur in areas not receiving significant use by subsistence users.

The available evidence shows that the overwhelming majority of subsistence deer hunting that takes place in the Big Islands Management Area occurs on Hawkins, Hinchinbrook islands and the north half of Montague Island. Hunting on the south half of the island, where the deer could be potentially impacted, is primarily by non-subsistence hunters.

The placement of a cabin within subsistence use areas would have a minimal impact on wildlife populations. The amount of ground disturbed is so small that a change in population level would not be discernible.

2.The Potential to Increase Competition

All of the roads, trails and airstrips proposed in the alternatives would be developed on the south half of Montague Island. Increased access to this area would not increase competition for subsistence resources historically used by Prince William Sound residents.

The proposed cabin in Shelter Bay could increase competition for deer slightly. Approximately 100-150 user days during the deer hunting season could come from non-unit 6 residents. This use would occur in an area moderately important to Cordova residents for deer hunting.

Alternative 5 proposes a cabin in Zaikof Bay and Rocky Bay. This area is the second most important deer hunting area to Cordova residents and the most productive deer hunting area. This area is currently receiving use by non-unit 6 residents who compete with subsistence users. Hunters currently using this area would probably continue to use it after the cabins are in place. The cabins could increase non-resident use by 100-200 user days during the hunting season.

These cabins would be available to subsistence users as well as non-subsistence users.

The timber management activities that would take place on national forest lands on Montague would not increase competition in other areas. The reduction in habitat would not be significant for the life of this plan and deer populations would not drop significantly. Changes in hunter distribution would not impact high subsistence use areas.

The timber management activities that would occur under any of the proposed alternatives on Montague Island would not significantly increase competition for subsistence resources in other areas. The reduction in habitat that would occur from the proposed action or other alternatives would not be significant and deer populations would show only minor changes to the change in habitat.

The timber management activities proposed around Patton Bay and Beach River on private land, combined with potential future timber management activities on National Forest land, may significantly reduce deer habitat and population on the south end of Montague in the future. The timber management activities on private land would occur independent of the Forest Service proposed action. Figure 4-2 displays the deer winter range that would be impacted by the proposed action, alternatives and private development. This shows that about four percent of the mean snowfall dear winter range would be impacted by Forest Service activities. Figure 4-4 estimates the deer winter range remaining at the end of the rotation on Montague Island and south Montague Island due to future Forest Service and private activities.

Large numbers of deer hunters that utilize the south end of Montague Island are not expected to shift away from this area due to the timber management or road development proposed on National Forest System lands. In the short-term there would be very little displacement of hunters. As habitat declines over the rotation due to activities outside the scope of this planning period, some reduction in hunting would occur. However, due to increased cost to access areas traditionally used by subsistence hunters, increased pressure on subsistence use areas would be slight.

3.The Potential to Restrict Access

Under all alternatives, including the proposed action, access by subsistence users would not be impacted. The management prescriptions and standards and guidelines do not restrict access. The developments proposed for the south end of Montague Island would improve access to this area.

The activities proposed in this MAA, if conducted in other parts of the management area or other parts of Prince William Sound, could impact subsistence resources to a greater extent than the areas selected here. Some of the available land would be closer to the communities in Prince William Sound classified as subsistence com-

munities and this would increase the potential for significant impacts to subsistence uses.

For subsistence purposes, other lands are available outside the management area. Some of these areas are currently being used by subsistence users. Other lands available for subsistence uses are private land or too far from the communities to be readily accessed for subsistence uses.

The environmental impact statement looked at several alternative ways of implementing the forest plan as amended. The no action alternative would have the least impact on subsistence resources or their use. Other alternatives focused the ground-disturbing activities such as timber management in the southern part of Montague Island. None of the alternatives focused significant activities in areas currently used by subsistence users.

Finding

The proposed action and other alternatives considered, focus management activities in areas currently receiving very low levels of subsistence use. Even if subsistence use of the south end of Montague Island increased due to impacts of the oil spill in Prince William Sound, the proposed action would not significantly impact the ability of subsistence users to harvest resources.

Future potential timber management and planned timber management on adjacent private land, may cause a drop in deer populations in the future. This decrease would occur in areas not currently receiving high subsistence use. Because many of the areas currently used by subsistence users require boat access not readily available to non-residents, and the cost is fairly high, any shift in hunting pressure away from the south end of Montague Island would be slight.

Marine resources make up over 75 percent of the subsistence resources used by Chenega residents and presumably Tatitlek residents. About 70 percent of the wild resources used by Cordova residents comes from the sea. The oil spill in Prince William Sound has mostly impacted the marine and intertidal environment. Any impacts to the subsistence use of resources would be concentrated in these same environments.

Based on the above process, and considering all the relevant information, this analysis finds that the impacts of the proposed action, combined with reasonably foreseeable-future activities, and activities planned on adjacent lands, would not significantly restrict subsistence use of wild resources in Prince William Sound.

Economic and Social

The timber section of this chapter contains an economic analysis based on timber appraisal analysis. This section displays costs and benefits of all proposed projects and compares the relative overall economic efficiency of each alternative.

The level and mix of goods and services made available to the public varies by alternative. These differences constitute the economic and social consequences discussed in this section. They include estimated government expenditures and revenues and impacts on local communities.

There are a number of aspects of social and economic consequences discussed in this section. The economic consequences of the alternatives are discussed in terms of present net value (PNV), discounted benefits and discounted costs. Present net value includes values assigned to potential changes in recreation use and timber production over a 10-year period. The direct, indirect and induced impacts of the project alternatives are discussed in terms of employment, income, and cumulative value to local communities.

The assumptions and procedures used to analyze economic consequences are outlined in the planning record. They are consistent with the process used for evaluating the economic consequences of the forest plan as amended. Data for prices and costs, however, were developed specifically for the MAA process.

There are three assumptions used in this analysis:

1. Predicted outputs are accurate; e.g., timber harvest will equal projected harvest levels.

2. The prices and costs assigned to resource outputs are accurate estimates of current and future resource values.

3. The Chugach National Forest budget will be adequate to support activities proposed in each alternative.

The estimates used in the analysis were based on costs actually experienced by the Forest as documented in the planning record. In the effort to improve efficiency, all opportunities to reduce both timber sale purchaser and government costs were explored.

While sale preparation, administration, and reforestation planning activities are not traditionally funded with money generated from timber sales, they are appropriately included in the estimates of total cost in each alternative. These funds are appropriated by Congress and are an expense in the implementation of an alternative. These funds are important elements in evaluating the economic tradeoffs between alternatives.

Important Interactions

In general, the short-term monetary value of the alternatives depends on the amount and method of timber harvest and road construction and the amount of land planted to rehabilitate harvest areas. The high cost of roads and logging may be offset by a resurgent lumber export market. The monetary value of the alternatives is also dependent on meeting expected recreation use levels once investments are in place.

Net Cash Value

Net revenue is the difference between the revenues generated by an alternative and the costs required to implement it. In this analysis, revenues are from timber harvests and recreation "willingness to pay" values for RVDs and WFUDs.

Timber management costs include: 1) timber sale preparation and administration; 2) road construction; 3) mitigation of the effects of timber harvests; 4) reforestation and 5) precommercial thinning.

Costs of building segments of roads depend on design standards and the difficulty of the terrain. The cost of road segments ranges from $131,372 to $141,345 per mile. The cost of reforestation depends on the amount of land planted and how far it is from roads. The range is between $400 to $600 per acre. Mitigation costs depend on the location and amount of measures required. The cost of precommercial thinning, including contract administration, is estimated at $400 per acre.

Recreation and fisheries management costs include: 1) operations and maintenance; 2) recreation facilities/trail construction and 3) fisheries projects.

Recreation and fisheries costs vary widely by alternative, based on the proposed level of investment in facilities/projects. Investment levels in turn affect the operation and maintenance costs of the alternative. Investments range from $2,000 for an interpretive site to $150,000 for a fisheries enhancement project.

Present Net Value

The future value of resources on the forest will be influenced by the decision made in this EIS. This is because managed timber stands would produce future cash flows, and investment in certain facilities (roads or airstrips) would provide access and reduce future recreation/timber management costs. The monetary value of the project area, as indicated by PNV, includes both the immediate benefits and costs of the timber and recreation outputs over the next 10 years. Present net value primarily reflects changes in net timber values and recreational "willingness to pay" values.

Present net value differs from the net cash value in that: 1) it includes values and costs expected from timber management and recreation for the next 10 years; and 2) it takes into account interest over time by discounting all benefits and costs over the next 10 years with a fourt percent discount rate.

The total value assigned to future timber management varies between alternatives (Figure 4-38) according to the amount of road/facilities that are proposed, the volume of timber harvested and the number of RVDs/WFUDs utilized. In some alternatives which include roads, the cost of the road system is partially offset by the value of the timber and cost sharing. The cost of the arterial road under Alternatives 4, 5 and 6 would be shared between the private landowner and the Forest Service with shares estimated at 63 percent and 37 percent respectively.

Communities

Timber harvest, recreation, wildlife and fish habitat, and other forest management activities affect local employment levels. However, effects attributable to any project alternative are relevant only in a comparative sense. These measures show how each alternative may differ from the next in the generation of jobs, income and value to communities (Figure 4-39). They are not indicators of any "improvement" in the local economy or quality of life, since these qualities are dependent on many non-quantifiable measures.

Figure 4-38 Present Net Value and Discounted Costs and Benefits of Alternatives

(Thousands of Dollars)

Alt.	PNV	Change	Discounted Costs	Change	Discounted Benefits	Change
7	1595		1056		2651	
		- 177				177
1	1418		1056		2474	
		-1123		7961		6838
6	295		9017		9312	
		- 105		1919		1814
5	190		10936		11126	
		- 193		-2667		-2860
4	- 3		8269		8266	
		- 235		- 209		- 444
3	-238		8060		7822	
		- 87		-1201		-1288
2	-325		6859		6534	

Figure 4-39 Changes in Employment, Personal Income and Value to Local Communities, Big Island Management Area

Alternative	1&7	2	3	4	5	6
Employment (Jobs)						
Timber	0	115	165	148	186	186
Recreation	0	6	11	19	86	18
TOTAL	0	121	176	167	272	204
Personal Income (000's $)						
Timber	0	3755	5400	4836	6083	6083
Recreation	0	115	217	372	1700	363
TOTAL	0	3870	5627	5208	7783	6446
Cumulative Value to Local Communities (000's $)						
Timber	0	16508	23715	21227	26614	26614
Recreation	0	298	562	965	4410	941
TOTAL	0	16806	24277	22192	31024	27555

NOTES: These changes are the cumulative effects of the national forest timber harvest volumes by alternative. The life of the sale is assumed to be five years, and all impacts are measured from a 1993 sale year. Employment impacts include direct effects (in the lumber and wood products industry) and indirect and induced effects (in all other industries). Personal income and cumulative value to local communities are expressed in 1985 dollars.

For example, jobs dependent on timber harvesting could increase if harvest is in addition to the normal level of timber harvest in the market area. But employment levels would be unchanged if the harvest is offset by harvest reductions elsewhere. Furthermore, adjustments within existing mill capacity could absorb increased timber harvest with little or no change in employment levels.

Alternative 1

Alternative 1 would produce only recreation benefits and incur only recreation costs, as no road or timber investments are planned. Discounted recreation benefits would amount to $2,474,000 from the 24,400 RVDs/WFUDs currently demanded. Increases in RVDs/WFUDs in other alternatives are compared to this baseline. The PNV would be $1,418,000 which is attributed to managing the project area for the next 10 years. This assumes that recreation use will increase over time with the small initial investment in wildlife/fisheries projects.

The cost of implementing this alternative is $139,000 in fiscal year 1990 to $129,000 in fiscal year 1999. No projected effect on employment, income or value to communities is anticipated under this alternative.

The continuation of a natural condition of the public lands in the project area would provide a high level of non-market values associated with dispersed recreation. Timber harvest on the private lands in the project area will impact dispersed recreation use and roadless attributes.

The allowable timber harvest specified in the amended forest plan would be shifted to other project areas of the forest. This condition would affect the next 10 years of the timber harvest schedule.

Alternative 2

Alternative 2 could be expected to generate a total of $6,534,000 in discounted benefits. Of this, discounted benefits of $2,492,000 from the harvest of 20 mmbf of timber would be realized. Recreation in the project area would result in $4,042,000 of discounted benefits from utilization of baseline RVDs/WFUDs plus 1,934 in additional RVDs/WFUDs. The PNV would be -$325,000, which is attributed to managing the project area for the next 10 years. This assumes that all timber volume will be sold and harvested at the estimated stumpage rate, and that recreation use will increase over time based on the initial investment in recreation and wildlife/fisheries projects.

The cost of implementing this alternative is $1,004,000 in ficsal year 1990 to $129,000 in fiscal year 1999. The total projected effect on employment is 121 jobs. Related to this is a change of $3,870,000 in income and $16,806,000 in cumulative value to local communities.

In terms of the dispersed recreation resource, road development and timber harvest activities would increase the opportunities for roaded recreation, i.e. hunting, camping, and access for fishing. Human activities would alter recreation opportunities, habitat, and visual quality. Timber harvest on public and private lands in the project area will impact dispersed recreation use and roadless attributes. The current level of non-market values associated with the current natural condition would be foregone.

Alternative 3

Alternative 3 could be expected to generate a total of $7,822,000 in discounted benefits. Of this, discounted benefits of $3,662,000 from the harvest of 31 mmbf of timber would be realized. Recreation in the project area would result in $4,160,000 of discounted benefits from utilization of baseline RVDs/WFUDs plus 3,646 in additional RVDs/WFUDs. The PNV would be -$238,000, which is attributed to managing the project area for the next ten years. This assumes that all timber volume will be sold and harvested at the estimated stumpage rate, and that recreation use will increase over time based on the initial investment in recreation and wildlife/fisheries projects.

The cost of implementing this alternative is $1,472,000 in fiscal year 1990 to $129,000 in fiscal year 1999. The total projected effect on employment is 176 jobs. Related to this is a change of $5,627,000 in income and $24,277,000 in cumulative value to local communities.

In terms of the dispersed recreation resource, road development and timber harvest activities would increase the opportunities for roaded recreation, i.e. hunting, camping, and access for fishing. Human activities would alter recreation opportunities, habitat, and visual quality. Timber harvest on public and private lands in the project area will impact dispersed recreation use and roadless attributes. The current level of non-market values associated with the current natural condition would be foregone.

Alternative 4

Alternative 4 could be expected to generate a total of $8,266,000 in discounted benefits. Of this, discounted benefits of $3,489,000 from the harvest of 27 mmbf of timber would be realized. Recreation in the project area would result in $4,777,000 of discounted benefits from utilization of baseline RVDs/WFUDs plus 6,266 in additional RVDs/WFUDss. The PNV would be -$3,000, which is attributed to managing the project area for the next 10 years. This assumes that all timber volume will be sold and harvested at the estimated stumpage rate, and that recreation use will increase over time based on the initial investment in recreation and wildlife/fisheries projects.

The cost of implementing this alternative is $1,584,000 in fiscal year 1990 to $129,000 in fiscal year 1999. The total projected effect on employment is 167 jobs. Related to this is a change of $5,208 thousand in income and $22,192,000 in cumulative value to local communities.

In terms of the dispersed recreation resource, road development and timber harvest activities would increase the opportunities for roaded recreation; i.e. hunting, camping, and access for fishing. Human activities would alter recreation opportunities, habitat, and visual quality. Timber harvest on

public and private lands in the project area will impact dispersed recreation use and roadless attributes. The current level of non-market values associated with the current natural condition would be foregone.

Alternative 5

Alternative 5 could be expected to generate a total of $11,126,000 in discounted benefits. Of this, discounted benefits of $4,689,000 from the harvest of 36 mmbf of timber would be realized. Recreation in the project area would result in $6,437,000 of dis-

counted benefits from utilization of baseline RVDs/WFUDs plus 28,630 in additional RVDs/WFUDs. The PNV would be $190,000, which is attributed to managing the project area for the next 10 years. This assumes that all timber volume will be sold and harvested at the estimated stumpage rate, and that recreation use will increase over time based on the initial investment in recreation and wildlife/fisheries projects.

The cost of implementing this alternative is $1,785,000 in fiscal year 1990 to $129,000 in fiscal year 1999. The total projected effect on employment is 272 jobs. Related to this is a change of $7,783,000 in income and $31,024,000 in cumulative value to local communities.

In terms of the dispersed recreation resource, road development and timber harvest activities would increase the opportunities for roaded recreation, i.e. hunting, camping, and access for fishing. Human activities would alter recreation opportunities, habitat, and visual quality. Timber harvest on

public and private lands in the project area will impact dispersed recreation use and roadless attributes. The current level of non-market values associated with the current natural condition would be foregone.

Alternative 6

Alternative 6 could be expected to generate a total of $9,312,000 in discounted benefits. Of this, discounted benefits of $4,455,000 from the harvest of 36 mmbf of timber would be realized. Recreation in the project area would result in $4,857,000 of discounted benefits from utilization of baseline RVDs/WFUDs plus 6,108 in additional RVDs/WFUDs. The PNV would be $295,000, which is attributed to managing the project area for the next 10 years. This assumes that all timber volume will be sold and harvested at the estimated stumpage rate, and that recreation use will increase over time based on the initial investment in recreation and wildlife/fisheries projects.

The cost of implementing this alternative is $1,849,000 in fiscal year 1990 to $129,000 in fiscal year 1999. The total projected effect on employment is 204 jobs. Related to this is a change of $6,446 thousand in income and $27,555,000 in cumulative value to local communities.

In terms of the dispersed recreation resource, road development and timber harvest activities would increase the opportunities for roaded recreation; i.e. hunting, camping, and access for fishing. Human activities would alter recreation opportunities, habitat, and visual quality. Timber harvest on public and private lands in the project area will impact dispersed recreation use and roadless attributes. The current level of non-market values associated with the current natural condition would be foregone.

Alternative 7

Alternative 7 would produce only recreation benefits and incur only recreation costs, as no Forest Service road or timber investments are planned. Discounted recreation benefits would amount to $2,651,000 from the 24,400 RVDs/WFUDs currently demanded. The PNV would be $4,917,000 which is attributed to managing the project area for the next 10 years. This assumes that recreation use will increase over time with the small initial investment in wildlife/fisheries projects.

The cost of implementing this alternative is $133,000 in fiscal year 1990 to $87,000 in fiscal year 1999. No projected effect on employment, income or value to communities is anticipated under this alternative.

Timber harvest on the private lands in the project area will impact dispersed recreation use and roadless attributes.

The allowable timber harvest specified in the amended forest plan would be shifted to other project areas of the forest. This condition would affect the next 10 years of the timber harvest schedule.

Probable Adverse Environmental Effects that Cannot Be Avoided

Implementation of Alternative 1 would probably not result in any adverse environmental effects.

Implementation of Alternatives 2-7 would inevitably result in some adverse environmental effects. The severity of these effects can be minimized by adhering to the mitigation measures described in Chapter 2. However, it is probable that the following impacts cannot be avoided.

Cultural Resources

Current inventory procedures do not provide complete assurance that all cultural resource sites will be located. Significant sites may be inadvertently destroyed or damaged. Until inventory techniques are improved, such impacts are unavoidable.

Wildlife

Wildlife will be displaced where habitat is disturbed by timber management activities, facility development or recreation use.

Water

Soil erosion and subsequent increases in sedimentation over natural levels is an inherent risk when management activities disturb the vegetative cover and disturb or expose the mineral soil. This risk increases with road construction and timber harvest activities.

Implementation of Alternatives 2 through 7 will probably result in sediment production that will exceed natural rates during the short-term as roads are built, timber is harvested, and other activities take place which disturb the vegetation and soil. As a result, state and federal water quality standards for beneficial uses may not be met in some specific locations in the short-term. However, the application of mitigation measures discussed in Chapter 2 is expected to keep the severity and probability of such unavoidable adverse effects to a minimum.

Recreation
The primitive character and recreation opportunities of all or part of the unroaded project area would be altered by all of the action alternatives.

Visual Resources
The construction of new roads will have a long-lasting visual impact by changing the lines, color, texture, earth forms and vegetative growth along the road corridors. Timber harvesting will impact the visual resource in the short-term. Once the harvest units are restocked with new young trees, the visual impacts of timber harvest will diminish over time. The duration of these impacts can be expected to generally last from 20 to 40 years, before the landscape would return to a natural appearance.

Irreversible and Irretrievable Commitment of Resources
An irreversible commitment of resources results from a decision to use or modify resources that are renewable only over a long period of time. Nonrenewable resources, such as rock resources and minerals, are an irreversible commitment once used. An irretrievable commitment of resources refers to resource production or the use of a renewable resource that is lost because of land allocation and/or scheduling decisions. In other words, opportunities are foregone for the period of time that the resource cannot be used.

The alternatives examined in the Big Islands Management Area FEIS are all based on the principles of multiple use and long-term productivity for all resources. Measures to protect natural resources that could be irreversibly affected by management practices are incorporated into the mitigation measures discussed in Chapter 2. The following is an assessment by resource of irreversible and irretrievable commitments that would be made in implementation of each alternative.

Minerals
Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of mineral resources.

Implementation of Alternatives 2-7 which call for the development of rock quarries on the south end of Montague Island for road construction material would represent an irreversible commitment once used.

Fish and Wildlife
Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of fish and wildlife resources.

Implementation of Alternatives 2-7 would result in an irreversible and irretrievable commitment of wildlife habitat because existing habitat in mature and over-mature forested stands, once harvested or replaced by roads and rock quarries, will require at least 100 years to be replaced.

Implementation of Alternatives 2-7 would not result in any irreversible or irretrievable commitment of fish resources.

Vegetation

Implementation of Alternative 1 would result in an irretrievable commitment of the entire timber resource of the management area for the planning period.

Implementation of Alternatives 2-7 would result in an irretrievable commitment of the timber resource in mature and over-mature timber stands on productive forest land that will not be harvested due to poor soil stability, slopes greater than 75 percent, wildlife habitat maintenance, fisheries concerns, economic considerations, designation as a natural research area or management in Primitive ROS class. The commitment is irretrievable rather than irreversible because future technological advances or drastic market increases could make harvest of these areas possible and feasible. These commitments may be changed as a result of future land management planning.

Recreation

Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of recreation resources.

There would be an irreversible loss of Primitive and Semi-primitive Non-motorized ROS associated with timber harvest and/or road construction in the south Montague Island project area by implementation of Alternatives 2-7.

Visual Resources

Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of the visual resource.

Implementation of Alternatives 2 through 6 would result in irreversible and irretrievable changes in the natural appearance of the landscape that would result from road building, LTF construction, rock quarries, trails, cabins, airstrips, boat landings and timber harvest.

Implementation of Alternative 7 would limit the above changes to the special use road corridor and rock quarries.

Cultural Resources

There are no irreversible or irretrievable commitments of cultural resources associated with implementation of any of the alternatives. Current management practices will continue for those sites previously discovered. Newly discovered sites will be managed according to the applicable standards and guidelines for cultural resources.

Soil

Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of soil resources.

Management activities can result in the acceleration of natural processes such as landslides (mass movements) and soil erosion. The potential for landslides and soil erosion may be accelerated from blowdown along cutting unit boundaries, road construction, and rock quarries and/or by the removal of trees causing an increase in soil-water content.

In implementation of Alternatives 2 through 6, no timber harvest is scheduled to occur on sideslopes in excess of 75 percent slope or in stands having unstable soils. Despite these precautions, there is still an inherent risk of landslides when harvesting timber on sideslopes in the 40 to 75 percent slope range.

Because landslides sometimes scour to bedrock, the productivity on these sites could be lost until soil-forming processes can rebuild the soil. Additionally, there is a potential to lose soil productivity in stands located in valley bottoms on alluvial soils if the surface organic layer is inadvertently removed during the yarding of felled timber. Any loss of soil productivity due to management activities is an irreversible loss. The above mentioned precautions and the mitigation measures discussed in Chapter 2 are expected to avoid most irreversible soil losses resulting from management activities.

In implementation of Alternatives 2-7, the loss of soil productivity on land removed from vegetative production for roads, LTFs, trails, boat landings, and airstrips would be an irreversible and irretrievable commitment.

Water

Implementation of Alternative 1 would not result in any irreversible or irretrievable commitment of water resources. Natural soil erosion and landslides would continue to produce sedimentation into streams from exposed mineral soils.

In implementation of Alternatives 2-7, mitigation measures, Best Management Practices (BMP's), and applicable standards and guidelines are designed to minimize soil disturbance and subsequent soil erosion which leads to non-point water pollution that could result from proposed management activities. The application of these measures is expected to result in no irreversible or irretrievable commitment of the water resource.

Roadless Character

Montague Island is currently unroaded. Implementation of Alternative 1 would not change the roadless character of the island and thus would not result in any irreversible or irretrievable commitment.

Implementation of Alternatives 2 and 3 would result in road development from MacLeod Harbor to San Juan Bay on the southwest end of the island. This represents an irreversible and irretrievable commitment as the roadless character in this portion of the island would be lost.

Implementation of Alternatives 4, 5 and 6 would result in road development from MacLeod Harbor to CAC lands in Patton Bay on the south end of the island. This represents an irreversible and irretrievable commitment as the roadless character in this portion of the island would lost.

In implementing Alternative 7, a special use road on the south end of Montague island would be an irretrievable commitment since the road will be obliterated after use, and over time, the area could regain its roadless character. While the road remains in place, there would be a loss of the roadless character on the south end of the island.

Oil Spill Effects

Introduction

The full impact of the March 24, 1989, Exxon Valdez oil spill on the management area and throughout Prince William Sound has not yet been determined. State and federal agencies are proposing long-term reseach projects to study the effects of the oil spill. Until data has been collected and analyzed from these studies (estimated at 3-5 years), overall effects of the spill will not be known with certainty. Review of currently available information, however, indicates that the oil spill will not have significant impacts on resources in areas affected by the alternatives considered in this document. The impacts of the alternatives will not alter the resources of the management area or Prince William Sound to an extent that would be significant in terms of future recovery of resources impacted by the oil spill. So oil spill impacts, although significant to other areas and to Prince William Sound as a whole, do not bear on the proposed action or its impacts. Information not yet available regarding oil spill impacts is likewise not likely to be relevant to the proposed action or associated reasonably foreseeable impacts or essential to a reasoned choice among alternatives considered in this document. The only known areas of oiling currently mapped by the Alaska Department of Environmental Conservation in the management area occur on Green Island and adjacent island clusters and a small portion of beach on the northwest end of Montague Island between Stockdale Harbor and Rocky Bay (Map 26). A preliminary report on overall impacts of the oil spill, included in the May 1989 report to the President issued by the Department of Transportation and the Environmental Protection Agency, is available in the planning file. A summary of potential oil spill impacts to resources in relation to impacts of alternatives for the management area follows.

Wildlife and Fish

The information gathered from the studies mentioned above will be used along with the data from the MIS monitoring program on Montague Island to assist with management of the fish and wildlife populations.

General Effects to Prince William Sound

Most of the effects of the oil spill on wildlife and fish populations in Prince William Sound and the management area are confined to the marine/intertidal environments. Potential effects to the fish and wildlife in Prince William Sound include direct mortality and many potential secondary effects such as decreased productivity due to a variety of causes ranging from a reduction of available food to diminished reproductive success, displacement of populations to lower quality habitat and poor survival of young.

Initial data suggests that eagle, seal, sea otter, marbled murrelet and other seabird and waterfowl populations in Prince William Sound are being significantly impacted from the oil spill. There is concern that mink, river otters and bears may be killed from scavenging oil covered carcasses. Black-tailed deer may have been impacted from eating oiled kelp.

PRINCE WILLIAM SOUND

Whittier

Naked Island

Knight Island

Green Island

Montague Island

Chenega Bay

OIL IMPACT CLASSES

- Heavy
- Moderate
- Light
- No Observed Oil
- Unobserved

Oil impact data were compiled by the Alaska Department of Environmental Conservation based on aerial and on-site surveys.

Data current June 8, 1989

0 1 2 3 4 MILES

MAP 26

The effects of the oil on anadromous fish in Prince William Sound is unknown. Once the salmon return to Prince William Sound, the adults will be tested for signs of the oil. Until these tests are conducted it is impossible to understand the impact on the fisheries resource. Studies have been proposed to study the range of effects on important estuaries and to study the response of fish to the oil.

The commercial fisheries in Prince William Sound have already been affected by the closure of the 1989 commercial herring season and future restrictions on commercial fishing may occur. Regardless of the impact to anadromous fish, the general public will likely connect fish harvested in Prince William Sound with potential oil contamination.

Direct Effects on the Management Area

The direct effects of the oil spill on the Big Islands Management Area are not considered to be significant at this time. Of the areas known to be oiled, Green Island is known for its abundance of nesting birds and for its marine mammals. Data is not available to predict how severely these populations were affected. No eagle nests are currently documented on Green Island but three known eagle nests are adjacent to a section of oiled beach on Montague Island. Effects on eagles on the northwest coast of Montague Island are unknown. Monitoring and proposed research efforts during the nesting season will provide more information.

The bird populations have the greatest risk of being directly affected by the oil because of their mobility. Potentially, waterfowl, shorebirds, seabirds and raptors that normally nest on the management area could suffer direct and secondary effects by coming into contact with oil during migration or foraging forays. The potential for scavenging mammals to find oiled carcasses away from oiled beaches is unknown at this time but could pose a threat to brown bear, mink and river otters on the management area.

Indirect Effects to the Management Area

There is not enough data available to predict what indirect effects the oil spill will have on the management area. The potential effects include a shift in the wildlife populations from oil impacted areas of the sound to portions of the management area that were not impacted. This could mean an increase in populations in areas not affected by the oil spill (assuming that the habitat can support higher numbers). Theoretically, the importance of wildlife populations and habitats that are not impacted by the oil spill will increase because overall population numbers could be lowered. This is especially true of the fisheries resources in Prince William Sound. If the salmon are significantly impacted by the oil, salmon returning to non-oiled regions of the sound may become much more important for commercial and recreational fishing. There will likely be an increased emphasis on protecting non-oiled areas important for migratory birds.

Cumulative Effects of Oil Spill and Proposed Actions on Montague Island

The activities associated with the various alternatives occur mainly on the south end of Montague Island which has not been oiled. Actions proposed under any alternative on Forest Service lands are not expected to significantly affect any of the MIS or species impacted by the oil spill. The management area-wide standards and guidelines provide mitigation measures to minimize any potential impacts from timber

harvest and roading (Appendix F). Alternatives 2 through 6 propose several fisheries enhancement projects that would benefit commercial and sport fisheries.

The proposed roading in Alternatives 2 through 6 should not contribute to any loss of habitat caused by the oil spill. Proposed roads would be placed on upland sites and uplifted beach and there should be no adverse effect on the intertidal zone. However, some disturbance to bears, other terrestrial animals and birds that may use coastline areas may occur. Proposed roading under Alternatives 2-6 will likely result in increased harvest of deer and brown bear on south Montague Island. The effects of the oil spill on deer and brown bear are unknown.

Maintenance of productive habitats that may be vital in the recovery of species severely impacted by the oil spill must be considered. Marbled murrelets (a seabird that nests in old growth forest), eagles, waterfowl, marine mammals, and anadromous fish populations are of particular concern. Timber harvest may reduce potential nesting habitat for the marbled murrelets and eagles, but effects are not expected to be significant. The development of log transfer facilities in MacLeod Harbor or Patton Bay may impact small areas of the intertidal zone and marine environment and disturb marine mammals. Standards and guidelines for siting, construction and operation of LTFs will minimize any potential effects to the marine and fisheries resources. Neither MacLeod Harbor nor Patton Bay are considered to be major staging areas for migratory waterbirds.

Any adverse effects to the MIS from the oil spill may make it more difficult to monitor and isolate the effects of Forest Service actions on these species. The results of the studies by state and federal agencies to determine the effects of the oil spill will be used in conjunction with data collected from the monitoring program on Montague Island to analyze effects of Forest Service actions.

Subsistence

The March 24, 1989 oil spill in Prince William Sound directly impacted the ability of Chenega Bay to gather marine-oriented resources for subsistence uses. While the oil did not come as close to the village of Tatitlek, the fear of harvesting contaminated resources has prevented harvesting from traditional areas near the village. Cordova residents are the farthest away from the oil spill. Although areas near the town were not impacted, much of the subsistence harvest is taken from commercial vessels operating in the sound.

The villages of Tatitlek and Chenega Bay are receiving supplemental food from other villages as well as assistance from Exxon in providing food. Limited harvesting for halibut and salmon has resumed in Tatitlek (Stratton pers com).

Tatitlek and Chenega Bay are being allowed to harvest salmon from the Copper River flats for the 1989 season to meet their subsistence needs. While the long-term impacts to salmon and other marine resources are not known, all indications to date are that the oil is not mixing with the water column and contamination is restricted to beaches and surface areas where oil is still present. The few samples collected from halibut caught in areas that were oiled are not showing any signs of being contaminated. Many of the clam beaches traditionally used near Chenega Bay were not oiled.

The salmon needs for Chenega Bay and Tatitlek are being met this year through emergency orders. The long-term marine resource needs for all subsistence resources

users in Prince William Sound will depend on any mixing between the oil and water and contamination by salmon, halibut and marine mammals.

There is no indication that south Montague Island is important either as a traditional use area for subsistence harvest or as a substitute area for areas impacted by the oil spill. The proposed action and alternatives would not impact the marine environment or resources available for subsistence harvest.

Recreation

The management area receives its heaviest recreation visitor use on the south end of Montague Islandparticularly centered around the five recreation cabins. The next most visited areas are the remaining four recreation cabins in the management area. Another large segment of visitor use results from the passage of cruise ships through Hinchinbrook Entrance and an Alaska Marine Highway System ferry which has scheduled weekly service during summer months through Montague Strait.

In addition to mapped information obtained from the Alaska Department of Environmental Conservation, other information was obtained from Chugach National Forest employees most familiar with the impacts to date.

Direct, short-term effects of the oil spill on the recreation resource in the management area are not considered significant at this time. Out of 24,500 RVD's of total use, the estimated reduction is less than 700 RVD's. One of nine cabins was directly impacted by the oil and it is not heavily used.

A recreation damage assessment study, covering the next five years, has been proposed to evaluate the oil spill impacts to recreation use and tourism in Prince William Sound in a more comprehensive manner.

General Effects

A general effect, which cannot be quantified until the above mentioned damage assessment is completed, is the change in the image of a pristine Prince William Sound. The measurable attribute is the intrinsic value inherent in such an area. Intrinsic values refer to the idea that Prince William Sound is valuable to people who just want to know that it is there or know that they have an option to use it. The media coverage has been focused and constant on the fouling of Prince William Sound. It is likely that, for some time to come, the general public will connect Prince William Sound with the oil spill.

Direct Effects

In the area of known oiling, the public recreation cabins at Green Island and Port Chalmers are being used to house federal personnel working on the oil spill and are not currently available for public use. In addition, an administrative cabin at Rocky Bay is being used for workers on the oil spill. The average annual use at the Port Chalmers cabin is 400 RVD's. The shoreline on the northwest side of Green Island, which includes the recreation cabin, has been heavily oiled. The cabin, which generates about 300 RVD's annually, was attractive for its marine mammal viewing opportunity. The shoreline above Stockdale Harbor, which received light oiling, receives little use.

Indirect Effects

The south end of Montague, which receives the heaviest recreation use in the management area, is not directly affected but could experience a reduction in recreation cabin use and hunting use as a result of media coverage of the oil spill. So far, only three cabin reservation cancellations attributable to the oil spill have occurred and these were cabins outside the management area.

Potential Impacts Outside of the Management Area

The majority of the National Forest System lands directly affected were in western Prince William Sound and outside this management area. A number of these heavily oiled islands are used by boaters and kayakers for day use and overnight camping who traveled to Whittier for that purpose. There is the potential for a shift in that type of use to the management area, but the amount of use which might transfer to the management area is insignificant. The best places to kayak and camp on beaches is the inside of Montague Island. That is a very long trip which the average boater and kayaker would not make. Currently the only recorded use is occasional trips by the National Outdoor Leadership School. The north end of Montague receives light boating use originating from Cordova and Valdez.

Visual Resource

General Effects

In general, the effects of the oil spill upon the visual resource are relatively slight when viewed from the highest volume travel routes associated with the management area. While major portions of Green Island were moderately to heavily affected and the northwest portion of Montague Island was lightly oiled, those effects are not visible from cruise ship or ferry routes, which are the most sensitive travel corridors in or around the management area. All those routes are sufficiently distant from the affected areas to prevent the visibility of impacts.

Direct Effects

The direct consequences of the oil spill upon the beaches is only noticeable to any degree when seen as foreground. When seen from a relatively close distance, the effects are quite apparent. In cases where a long and wide section of beach is oiled those consequences could dominate the landscape but, in general, when the beach itself is not a dominant part of the view, the overall scene would remain predominantly natural. This means that the affected shorelines would most often change in visual condition to level III (they were generally natural, visual condition level II, in appearance but not totally pristine or untouched). Areas with larger depositions of oil would decline to visual condition level IV because the unnatural oiled beach would become a dominant element that would overwhelm the natural landscape character.

The most visually sensitive section of shoreline that has been oiled is Gibbon Anchorage, on which a Forest Service recreation cabin is located. Because of views from the ferry routes and from the cabin, the northwestern side of Green Island is sensitivity level 1 and has a Retention Visual Quality Objective (VQO). When seen from the middleground distance of the ferry route, that objective would be met. When seen

from the cabin and use areas around the cabin, however, the objective would not be met.

Oiled shoreline along the northwest coast of Montague Island has a Partial Retention VQO. The lighter depositions found along this stretch of beach would generally comply with this objective even when seen as foreground.

The more intense of the mechanical shoreline cleanup efforts would generate additional landscape alterations through disturbance of the ground surface. Large areas with roughened, raveled surfaces resulting from high-pressure hosing create an impact with a different look but a similar intensity to the original oiling. Thus the cleaning reduces the visibility of the oil but increases ground disturbance resulting in no significant change in the net level of landscape alteration.

Durations of visual impacts from both the spill and the cleaning would be relatively short (years, not decades) but would tend to endure longer in sheltered locations like Gibbon Anchorage and would last for shorter times in exposed locations subject to storms.

Indirect Effects

While the direct effects of the spill upon the visual resource are not highly significant, public sensitivities and interest in the spill will heighten the degree to which the changes in the landscape are noticed and the perceived degree of landscape alteration.

Soils

Of the known oiled areas in the management area, the shoreline of Green Island was impacted by a proportionally heavy amount of oil and the shoreline of Montague Island was considerably lighter. The more heavily impacted areas are scheduled to be cleaned up by the cleanup crews working the rest of Prince William Sound.

Direct Effects

The soils that have been affected by the oil are located mostly in the intertidal areas. The duration of the oil until cleanup and the amount, toxicity, and consistency of the oil that was deposited will determine the impact to the soils and the biological community contained within the soil. The extent of the impacts is something that will be measured over a period of time in order to make a proper assessment of the impacts.

Additional impacts to the soil and the vegetation affected by the oil will be incurred from the cleanup activities that take place, simply from the disturbance required in the removal of the oil. The amount of disturbance will be determined from the cleanup method used and the amount and depth of oil that must be removed. Additional impacts such as trampling of the vegetation and compaction of the soil by the excessive number of people may be expected on the immediate uplands adjacent the oiled area.

Indirect Effects

There are no indirect impacts expected to the soils in areas of the management area that have not been affected directly by the oil.

Water

Direct Effects

The water quality on national forest land that was affected by the oil spill is in areas where oil was deposited above mean high tide in estuaries and on shorelines, or those areas where oil was carried upland from wave splash. The time for the water to return to its original quality will vary with each of the areas impacted. Since the rest of the water flows from the upland areas of the national forest through those areas affected by the oil, there should not be a direct effect on the water quality that is still on the Forest.

Indirect Effects

Indirect effects from the oil spill may be the increased use of upland water by wildlife, waterfowl and people because of the impacts on the water in the oiled areas.

Chapter 5
Public Participation

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Public Participation

Introduction

This chapter includes: 1) A brief account of public participation activities prior to and following publication of the Draft EIS; 2) a description of public responses; 3) a summary of comments and responses; 4) photocopies of letters from elected officials and federal and state agencies; and a list of names of those who submitted comments.

The full text of letters from government agencies and elected officials is reproduced in accordance with USDA Forest Service policy. This does not imply that the many comments from individuals and groups were considered less seriously. The agency letters are reproduced to inform readers of the positions taken by their public servants.

Substantive comments from letters not reproduced in full are organized by topic such as individual resources, planning process or uses such as subsistence use. Every attempt was made to accurately capture each substantive comment and display it appropriately. Comments of a similar nature may be grouped together for response. Some comments were not published because they constituted a simple expression of support for one alternative or another. Opinion statements were registered and taken into account.

The text of the EIS reflects changes made as a result of comments received from various sources. These may occur in any of the preceding chapters.

Summary of Public Participation

The Draft EIS was distributed in March to more than 400 individuals and organizations. In addition, a summary of the Draft EIS was sent in the form of a newsletter to several hundred persons on the mailing list for the area analysis. Additional copies were provided on request.

A series of open houses was scheduled in Cordova, Valdez and Anchorage after distribution of the draft to allow members of the public to meet with the the planning team ask questions and discuss aspects of the impact statement. The open house scheduled for Valdez was postponed due to adverse weather conditions. The subsequent oil spill resulted in cancellation of the session. In addition, the planning team met with representatives of interest and user groups to further explain the EIS and answer questions.

Public Response To The DEIS

A total of 62 letters/petitions were received by the Chugach National Forest commenting on the Draft EIS. One hundred thirty-one persons signed the petition. Letters were date stamped, entered in a log and numbered. They were reviewed by the public involvement specialist for assignment to one or more categories of response.

Substantive comments were assigned to various team members to review and address. As an example, comments on soils were assigned to the soils scientist and comments on the planning process to the planning staff officer. Where possible changes resulting from public comments were incorporated into the final EIS.

Of the comments excerpted from the letters 143 referred to the planning process, 92 to transportation and 21 to the Chugach Alaska Corporation road proposal.

In the following section public comments appear in boldface type. Responses appear in regular type. Comments represent single or groups of comments.

Access

> "**The Alternative 6 road alignment, as proposed by the landowner, would enhance traffic safety, reduce road maintenance costs and allow for longer seasonal operations.**"
>
> "**This also increases road maintenance costs and reduces traffic safety.**"

The arterial roads have identical alignments for approximately 25 miles in Alternatives 5 and 6, differing over an additional 10-mile section. Within the 10 mile section both alternative routes travel through the same saddle at an elevation of 450 feet at the head of Strike Creek. This is the highest point along the entire route. Alternative 5 alignment descends to an elevation of 200 ft where it joins the alignment of Alternative 6 south of the Nellie Martin River drainage.

Since both roads go through the same high point in elevation there would be no difference in the length of the operating season. Reduction in traffic safety for any road in winter conditions is inherent and unavoidable. Maintenance would be slightly higher for the Alternative 5 route.

> "**..the alignment should be altered to minimize environmental impacts,...**"

Mitigation measures are designed to minimize impacts in all alternatives.

> "**- all stream crossings of fish habitat be installed and maintained during road use pursuant to Title 16 Permit requirements, and removed with the roadbed when no longer needed.**"

Stream habitats could also be adversely affected by stream crossings and by logging. Impacts from stream crossings could be mitigated through adherence to Title 16 permitting requirements.

All streams crossings would be installed to protect the stream's fish habitat and stream water quality. The standards and guidelines direct such protection. Alternative 7 would have stream crossing structures removed at the end of their permitted use.

"A representative of the S.W. Alaska Pilots Association reviewed the Box Point area as a potential site for the transfer of logs to a ship. The Captain felt 'that MacLeod Harbor would be the ideal location...for the log ships...', and within his letter, the following comments regarding Box Point were given:"

"after a close inspection of the site at Box Point, followed by a study of the chart of the area, bottom constraints, tides and currents, the wind conditions..., I can say, with reservations, that it can be done."

The Transportation Plan (Appendix D) has a section devoted to the feasibility of LTFs on southern Montague Island. Box Point and MacLeod Harbor are both considered physically and economically feasible with rationale included for making this determination. The transportation plan examines these sites in comparison to operating a route from Patton Bay to MacLeod Harbor.

"..and its not up to me spend money providing them with a different type of access just to facilitate their economic gain."

"Moreover, cost sharing on this road is now completely inappropriate (if it ever was), since it would be a blatant federal subsidy to a private corporation without any benefit to the public."

In no alternative will there be indirect or direct subsidy of a commercial enterprise. In alternative 1, there will be no road costs involved. In alternative 2-3, road costs will be 100% the responsibility of the Forest Service since the roads are solely providing access to management of National Forest resources. In Alternatives 4-6, the Forest Service will be responsible only for its fair share of the road costs. In Alternative 7, only the private commercial resources will be using the road. 100% of the road costs will go to them and the Forest Service would have no financial burden.

"The assumptions underlying the 63/37 split on cost-sharing for the road do not appear to be well-founded."

"The Forest Service has failed to justify adequately its plans to share the costs for the road. The justification seems based on the percentage of logging that will occur on federal lands for which the road would be used."

"Moreover, the DEIS should acknowledge that if these ratios change so that the Forest Service pays a greater percentage, as they can and probably will, most of the alternatives would become even more uneconomical."

The ratio for sharing costs of the arterial road in alternatives 4 - 6 was developed strictly to aid in the analysis of the alternatives. The actual ratio for sharing costs of the arterial road, if it is selected for implementation, would be negotiated and agreed to as part of the cost share agreement between Chugach Alaska Corporation and the Forest Service.

Chugach Alaska Corporation Timber Harvest Plans

"I think you could upgrade the text description of the expected forest management practices by CAC. What will be the likely clear-cut size, spacing, timing, etc.? How is that figured into the deer population modeling and impact analyses based thereon?"

All the information provided by the corporation has been included in the document. Copies of the deer model and the map displaying areas assumed by the Forest Service to be harvested on private lands are available in the planning record.

"While the DEIS does mention some effects of CAC's projected logging plans, it does so mostly in an attempt to minimize its own effect on Montague Island. ....rather than trying to balance out the cumulative effects."

The effects of proposed harvest on Forest Service lands is discussed in the DEIS for each management indicator species (MIS) independent of actions on private lands in the sections on short-term effects of timber harvest. The cumulative effects section for each MIS discusses the effects of Forest Service and private harvest.

An attempt was made to minimize the cumulative effects of timber harvest near private lands in Patton Bay under all alternatives. Only alternative 6 proposes much harvest within Game Management 6 subunit 37. Under alternatives 2-6 most of the acres of productive forest near private lands in subunit 37 are proposed for management under an old growth prescription that does not permit timber harvest.

Oil Spill

"The DEIS assumes that "fish habitat will remain unchanged" on Hinchinbrook, Green and Hawkins Islands under all alternatives. Some of these areas have been affected by the oil spill; therefore, this statement is not valid until further study of the impact of the oil spill. Of the approximately fifty salmon streams between MacLeod and Patton Bay, half will be affected by 0oading and logging under the Service's preferred alternative."

"The eagle populations, for example, have suffered tremendous stress due to the oil spill. Conservation predictions suggest that approximately one-third of the bald eagles in Prince William Sound have died or will die due to the oil spill. Terrestrial wildlife are already experiencing severe impacts from exposure to contaminated habitats and food sources. The long term ramifications on these populations is not yet known. Similarly, the oil spill is expected to change significantly the recreational use patterns in the Sound. The assumptions on which the DEIS are based may no longer be viable and should be reassessed."

"The areas of Montague Island fortunate enough to escape oil spill destruction do not need another threat of destruction, the only benefit of which would appear to accrue to private interests. These Montague areas may be critically needed in the future for habitat restoration, reintroduction of wildlife and sealife species, for the proximate areas of the Sound which did suffer intense devastation. The eagle population of Montague Island in itself may have already been seriously affected, given the foraging range of the raptor".

I feel that at this time we need sanctuary areas for the wildlife of PWS; especially those from the Green Island, Knight Island, Naked Island and Montague areas to escape the noise, intrusion, and human impact of the beach cleanup, and "oil spill industry."

A number of comments were received expressing concern over the effect of the Valdez Oil Spill in Prince William Sound and the cumulative effect of proposed Forest actions on the Sound. These concerns have been addressed in the Oil Spill section of Chapter 4.

Brown Bear

"There are several contradictory statements in the DEIS regarding the effects of timber harvest on brown bears on south Montague Island."

"The DEIS states that the short-term effects of timber harvest under all alternatives would likely maintain or improve bear habitat capability (p. 4-40). It also states that removal of security cover along streams on private land will reduce the short-term habitat capability for brown bears (p. 4-40). The relationship of these statements needs to be clarified."

These sections have been clarified in the FEIS.

"The DEIS states on p. 4-40 that large timber harvest on private lands will significantly contribute to the reduction of long-term habitat capability for brown bears in Unit 37. Based on information from southeast Alaska, we

believe that the roading and timber harvest proposed for south Montague Island will have long-term significant negative impacts on the brown bear population. Further reductions of brown bear habitat carrying capacity on USFS lands, additive to that on private lands, does not constitute sound habitat management."

"The DEIS states that information on brown bear use of clear cut habitats in Prince William Sound is unavailable. This is true. However, we believe that habitats of Montague Island and of Chichagof Island are similar enough to allow comparisons to be made. In our judgement, based on the following studies, the proposed timber harvest activities will significantly affect brown bear movements and habitat use on Montague Island."

"Management Alternative 5 for south Montague Island is very similar to the situation experienced on Chichagof Island. Brown bear populations on south Montague Island will be severely impacted by roading and increased human use. Management of brown bears will require similar protective measures in the future."

"The DEIS does not adequately address the impacts of logging and roading on brown bears, whose numbers are already low. Statistics from Chichagof Island show that roading an area results in a tenfold increase in hunting kills, and that many more bears are killed in defense of life and property. The general statements on page 4-41 of the DEIS do not satisfy NEPA."

"The DEIS also fails to acknowledge the existence of information and studies from other forests that might be used to infer the impacts on Montague (e.g., ...impacts of roading on Chichagof Island on bears and hunting)."

References to the Chichagof Island study regarding potentials for increased mortalities of bears from increased access have been included in the FEIS where appropriate.

"The known bear concentration areas along Beach River and Nellie Martin River may be examples of such habitat components that attract bears from a wide area. We, therefore, do not agree with the statement on page 4-40 stating that brown bear habitat capability would likely be maintained through the 100 year rotation."

The statement on page 4-40 was made in reference to habitat capability on National Forest lands only. Large clearcuts and expected removal of much of the timber along salmon streams on private lands will likely reduce habitat capability on private lands. Actions on Forest Service lands are not expected to significantly contribute to this reduction. Management strategies necessary to insure maintenance of habitat

capability during any potential future harvest on Forest Service lands are explained in Chapter 4 and Appendix F of the FEIS.

> **"...Thus, the DEIS's general statement that "between 2 and 7 percent of the riparian beach fringe habitat" will be destroyed by the road will not justify a conclusion that the effect on bears will be between 2 and 7 per cent."**

This statement was made in regards to the amount of productive beach fringe forest that would be harvested. Numerous acres of unproductive forest would provide cover for bears utilizing beach fringe habitats. In addition, much of the timber estimated to be harvested in beach fringe habitats would be retained in compliance with standards and guidelines for maintenance of eagle habitat.

Marbled Murrelet

> **"Marbled murrelets nest in old growth trees...There is nearly 100% mortality of marbled murrelets in the areas impacted by the spill, making them the most heavily impacted of all species. This makes the population in the Big Islands area critically important as a source for repopulation of the entire Sound, which makes preservation of their nesting habitat crucial. The Forest Service must avoid any destruction of the old growth trees used for nests."**

> "**Because of their unique nesting requirements** [of marbled murrelets]**, the unknown mortality to the Prince William Sound population caused by the oil spill, and the newly recognized status of this species by the USFWS, we recommend that the USFS include the marbled murrelets as a management indicator species for the Chugach National Forest."**

The marbled murrelet was not selected as a management indicator species for the Big Islands Management Area because it was not recognized as a category 2 Threatened and Endangered species by the U. S. Fish and Wildlife Service during consulation procedures for this document.

Mature forest maintained for Sitka black-tailed deer, eagles, mergansers and the Prince William Sound Canada goose, all management indicator species, is expected to provide essential habitats for a host of other wildlife species including marbled murrelets.

Deer

> **"The DEIS recognizes that the most preferred deer winter habitat is characterized by mid-volume mature commercial forest stands on south aspects at low elevations in areas of relatively low snow depths. ADF&G studies indicate that high-volume mature forest lands are also preferred deer winter habitat."**

"Map F in the DEIS depicts the existing vegetation on south Montague Island. Under the proposed alternative, all of the identified commercial forest stands on USFS lands will be accessed by the road and harvested. However, the USFS anticipates that under the preferred alternative, timber harvest will reduce deep snow (critical) winter habitat by only 13%, 13% and 2% in subunits 35, 36 and 37 respectively (p. 4-34). Based on Map F, and the known winter habitat requirements of black-tail deer, we question these figures and suggest that they be reevaluated."

In the DEIS, Alternative 5 was the proposed action. Further evaluation, including analysis of effects of deer habitat, has resulted in Alternative 7 being selected as the preferred alternative.

"Map F indicates that essential winter habitat vegetation (mature forest providing snow interception canopy) is not present along the southern beach fringe or on the south east peninsula of Montague Island from Jeanie Pt. north to Pointed Rock. However, the USFS (Map D) has identified these areas as containing key deer winter range. It is our understanding, based on studies conducted in southeast Alaska, that important (key) deer winter range is characterized by high and mid volume commercial stands that provide substantial canopies for snow interception during winter. We find these map classifications very contradictory and request the USFS to review their decisions and provide information justifying their classification."

The Key deer winter range depicted on the south and south east portion of Montague Island (Map D in DEIS, Map 4 FEIS) does include essential deer winter range. Approximately 571 acres of mature mid to high volume productive forest (commercial forest in DEIS) and 3,753 acres of mature unproductive forest are present within the area defined on south Montague Island. This delineation was developed with the assistance of Alaska Department of Fish and Game personnel and represents deer winter range in areas of relatively low winter snow depths. In addition, Alaska Department of Fish and Game personnel informed the Forest Service that the largest concentrations of wintering deer observed on south Montague during aerial surveys in the winter of 1989 were located on the north side of Jeanie Cove within this identified area.

While it is recognized that mid to high volume forest at low elevations provide the best wintering conditions, it is important to note that during deep snow winters deer are often forced to the beach by deep snows and unproductive mature forest and alder stands often provide the only available winter habitat. Reynolds (1979) noted that the beach and the timbered beach fringe is the most critical habitat to deer in Prince William Sound. He indicated that critical winter range is often less that a 100 yard wide strip of forest parallel to the beach.

All forested habitats have the potential to provide winter range habitat for deer depending on snow conditions and these values are incorporated into the analysis of the impacts of timber harvest on deer. However, the delineation in Map D in the DEIS (Map 4 in FEIS) was intended to include only the most important areas.

> **"Development of the arterial road would further impact deer populations on south Montague. The preferred route of the road occurs immediately along the coast line over about half of its length. This places the road in an area that deer utilize during critical periods of the year, further reducing their available habitat. Additionally, this road placement would make deer more vulnerable to hunters travelling the road, and would possible increase deer/vehicle collisions. These impacts should be further addressed in the final EIS."**

The Management Areawide Standards and Guidelines in Appendix F provide for the closure of roads in areas where deer are concentrated during critical wintering periods. Measures are also included for locating the road within the corridor as far as possible seaward from upland vegetation that provides habitat for wintering deer.

> **"We question the USFS statements in the DEIS on the value of second growth timber to wildlife species. On page 4-32, the DEIS states that "...mature forest character..." is expected to be reached sooner with precommercial thinning operations, and that all wildlife species dependent on mature forests would benefit from these thinning operations. However, the draft goes on to that the USFS is not certain when the second growth stands would begin to demonstrate the mature forest character essential to the maintenance of these populations. The USFS previously stated (p.4-31) that deer winter range is not replaced during the life of the standard timber rotation (100 years). Therefore, it is apparently the case that when these timber lands which provide essential wildlife habitat are harvested, they will be permanently lost to wildlife species dependent on that habitat. This scenario would not constitute sound management for species and habitat that are dedicated to a public multiple-use strategy."**

Precommercial thinnings with a wildlife emphasis are proposed on stands that were harvested between 1947 and 1974. These stands currently provide little forage for wildlife. The proposed thinnings are expected to benefit wildlife in the short-term by opening up the canopy and increasing forage production and in the long-term by accelerating the return of mature forest character. Vegetative response to second growth management in Prince William Sound is currently unknown, but based on initial results in southeast Alaska benefits to wildlife species are anticipated. Specifics on how thinnings will be accomplished are contained under the Wildlife/Visual prescription in Appendix F.

The effects of proposed harvest levels on wildlife species from the removal of mature forest under the various alternatives is displayed in the DEIS and FEIS. This analysis does not assume a positive benefit from second growth management techniques being

tested on previously harvested stands. Rather, the assumption is that mature forest character will not be replaced during the life of the timber rotation.

> **"While we agree that the increased access would provide greater numbers of people the opportunity to hunt, the high quality primitive hunting experiences currently enjoyed would be negatively impacted."**

> **"Deer abundance was the most important characteristic desired by hunters when considering areas to hunt. The presence of clear cuts and road access were, respectively, the next-to-last and last characteristic desired by deer hunters. Clearly, deer hunters in GMU 6 do not want roads and timber harvesting to occur in the areas they hunt."**

Proposed public roads will increase access and increase the number of deer available for harvest by hunters. Increased availability of deer for harvest in effect increases deer abundance from the hunters perspective. It is recognized that clearcuts and road access were not characteristics desired by deer hunters in the 1988 deer hunter survey. All other subunits (hunt areas) on Montague, Hinchinbrook, Hawkins and Green islands will remain unmodified by timber harvest and roads. See section on Hunting and Trapping in the FEIS.

> **"This indisputable consequence of clearcutting will be exacerbated by the topography of the island, which isolates population groups in particular areas. The ridges and deep snow inhibit deer movement, making them less able to escape a stressed environment. The model used to analyze deer habitat did not take this isolation effect into account. This quirk of topography means clearcutting on Montague Island likely to have even greater effects on deer populations than it does in Southeast Alaska. This sort of site-specific condition must be assessed under NEPA."**

The deer model used to evaluate the impacts of proposed timber harvest on Montague Island was developed in cooperation with biologists from the Alaska Department of Fish and Game and the U. S. Fish and Wildlife Service (Barber et al. 1988) using the best available information. Values given to the various timber types in the model reflect the vegetative and topographic conditions found on the islands of Prince William Sound. Similar timber types were generally given lower values in the Prince William Sound model than in the model used in southeast Alaska due to the differences in topography and generally smaller sized timber stands. The model does assume that deep snow inhibits deer movement.

Fish

> **"The DEIS proposes riparian zone management prescriptions that should help to mitigate direct impacts of logging on stream habitats on FS lands in FS designated "high-priority" streams. However, the FS proposes a**

lower level of protection for other stream habitats which could negatively impact overall fish production in the area. "

"It is unlikely that all of the proposed projects will prove to be biologically and economically feasible. It is more likely that management decisions that provide a high level of protection to existing fish habitats will produce more fish in the long term than reliance on the proposed enhancement projects to offset potential impacts from management proposals in the DEIS including roading and logging."

The stream priority classification was used to display the relative value of the various streams and to evaluate the potential for impacts from proposed actions in a relative sense. The priority classification was also used in the alternative development process.

The Management Areawide Standards and Guidelines provide the same level of protection from proposed timber harvest and roads for all anadromous and high value resident fish streams regardless of the priority classification. Mitigation measures are somewhat less restrictive for streams containing no fish or resident fish streams with limited sport fisheries values (Appendix F and H). Additional direction is given for priority 1 streams through the application of the Riparian prescription (Appendix G). None of the proposed actions on Forest Service lands are expected to significantly affect fish habitat capability on any of the streams on south Montague Island.

We recognize that some of the fisheries enhancement opportunities may not prove to be feasible. These feasibility projects are not proposed as mitigation for potential impacts from proposed timber harvest or roads.

"The DEIS completely ignores the special water quality needs of salmon, as it ignores the state's stringent water quality standards designed to protect anadramous fish streams."

Habitat capability for salmon, both from a habitat and water quality standpoint, will be protected through the implementation of the Management Area Wide Standards and Guidelines (Appendix F, FEIS).

"The DEIS fails to describe accurately or assess adequately the effects of logging and roading on fish habitat. See section V,

infra. For instance, it is completely unacceptable to excuse sedimentation from logging by noting that there are large natural fluctuations in salmon populations, making it difficult to observe sediment-induced changes. DEIS 4-18."

The best available information was used to assess the effects of logging and roads on fish habitat. Streams within the project area were surveyed through a cooperative effort with the Alaska Department of Fish in Game in the fall of 1988 (Sundberg 1988).

The Alaska Department of Fish and Game reviewed the fisheries analysis process. Standards and Guidelines in Appendix F provide for the protection of streamside timber for all anadromous and significant resident fish streams, maintenance of spawning and rearing habitat, and fish passage at all stream crossings.

The statement referenced on page 4-18 of the DEIS stated that "Because of the large natural fluctuations in anadromous fish population levels and the large flow fluctuations and high flushing rates in the affected stream courses, the increased sedimentation would not cause any observable change in MIS populations or in aquatic habitat capability with the Strike Creek, Deception Creek, or Stream # 17837." The main point is that the high flushing rates of the streams would remove most of the sediment that may enter the stream. This statement was made in reference to short-term increases in sediment during timber harvest. Sedimentation would drop back to preproject levels after completion of harvest and reestablishment of ground cover. Significant impacts to fish habitat capability are not expected from any potential sedimentation from timber harvest activities. Standards and Guidelines (Appendix F) provide measures to minimize sedimentation from timber harvest activities.

> **"Overall, the beach alignment allows for better access and makes it easier to initiate fishery enhancement opportunities at Jeanie Cove."**
>
> **"The beach location provides for better access and reduced costs in fisheries enhancement project opportunities at Jeanie Cove. Although these streams were termed as "relatively insignificant' by USFS staff personel, every opportunity to increase fisheries production within the Prince William Sound - gulf of Alaska region should be seriously considered."**

The two fisheries projects in Jeanie Cove are proposed for enhancement of sport fishing opportunities and are estimated to produce a total of approximately 1,500 pounds of fish annually. Both projects involve removal of barriers that can likely be accomplished with either proposed road alignment in the Jeanie Cove area. The beach location would impact the recreation experience in Jeanie Cove, whereas the upland location would avoid impacts to the beach area and provide trail access to these potential new fishing opportunities.

> **"6. Chapter 4.9 -- the map provided by CAC included all proposed roads anticipated in conjunction with timber harvest activities, temporary spur roads as well as permanent."**

The correction has been made in chapter 4 of the FEIS.

> **"7. Chapter 4.10 -- not all timber adjacent to anadromous fish streams will be harvested, to do otherwise has never been stated nor implied by CAC or its contractor."**

Information regarding how timber would be harvested adjacent to anadromous streams was not provided to the Forest Service by CAC.

> **"I would have favored an alternative that also included enhancement of commercial fish habitat. None of the remaining alternatives appeared to offer this feature, without including timber harvest."**

Commercial fish enhancement feasibility studies are included under all alternatives. Most of the proposed enhancement projects require the use of heavy equipment and road access associated with timber harvest in order to implement them.

Eagle

> **"The present management guidelines will ultimately result in small islands of eagle nesting habitat in extensive stands of young even-aged forests. Because the small leave areas are vulnerable to blowdown from severe windstorms, fire, disease and insect infestations, their longevity is limited and carrying capacity is significantly reduced."**

> **"We therefore recommend that the primary buffer area surrounding eagle nest-trees be increased to 50-250 ha., depending on the topography, stand characteristics and other factors."**

> **"In late April, the USFWS conducted surveys to identify eagle nest trees on Montague Island. Preliminary information indicates that nest trees in addition to those documented on Map D were located. We recommend that the location of these additional eagle nest trees be incorporated into the mapped data."**

The U.S. Fish and Wildlife Service is responsible for the management of the Bald Eagle and has guidelines to protect existing eagle nesting habitat and provide for future nest sites. The Forest Service currently has a memorandum of understanding with the U.S. Fish and Wildlife Service to follow these guidelines.

Only a single known nest is adjacent to a harvest unit in alternatives 2 and 3. No known eagle nests are adjacent to harvest units in alternatives 4, 5 and 6. The designated 330 foot buffer is a minimum. The exact boundary may be larger and will be based on local topography, timber type, windfirmness and other factors. The Management Areawide Standards and Guidelines in the DEIS and FEIS (Appendix F) include additional measures to protect eagle nesting habitat.

The information from the late April nest survey on Montague Island is not currently available. The Forest Service will survey project areas prior to implementation and any additional nests will be afforded the same protection as known nests.

Threatened and Endangered and Marine Mammals

"Your endangered species section is very superficial. For the alternatives that assume a CAC road from Patton Bay to MacLeod Harbor you should engage in consultation with the National Marine Fisheries Service regarding effects of vessel traffic (needed for transporting forest products) on endangered humpback and gray whales. If that road is built, there will be a major increase in noisy shipping into Montague Strait and MacLeod Harbor waters. That shipping will be a direct result of any Federal action permitting the road. What will that do to the whale populations or individual whales inhabiting critical habitats in the nearby marine environment? Certainly that volume of traffic will far exceed any expected from potential oil and gas development, for example. The NFMS has consulted on every Federal offshore Alaska oil and gas lease sale due to fear of impacts on whales and, therefore, your alternatives creating major increased vessel traffic at (to/from) MacLeod Harbor deserves similar scrutiny."

"A management analysis of the scale you have bitten off here should not ignore the crucial linkages to the marine environment and potential effects on marine mammals, especially when increased shipping is a likely result. If you don't consult with NMFS on this matter, I'd be interested in your rationale since it would appear to circumvent the spirit of the Endangered Species Act."

This section included a discussion of the Forest Service consultation with the National Marine Fisheries Service in regards to endangered whales present in nearby waters. They concurred with our assessment of no impact to the Humpback, Gray and Fin whales. The section discussing threatened and endangered species and consultation with NMFS has been included in Chapter 4 of the FEIS.

MIS and General Wildlife

"The environmental impacts of the road are not adequately discussed. The effects of road construction go beyond the physical acreage disturbed. Ancillary effects of road construction on wildlife, such as increased hunting pressures, road disturbance, additional human activity, or the role of critical habitat areas have not been assessed in the DEIS".

"In terms of impacts on wildlife habitat, the DEIS discusses only the quantity of habitat that will actually be destroyed by logging or roading on public lands. There is virtually no discussion of well-known effects of roading, such as increased disturbance because of human presence, noise, increased hunting, fragmentation of habitat, etc."

A discussion of the effects of increased roading and human access for hunting has been included in Chapter 4 of the FEIS.

"The DEIS limits the number of management indicator species in an unacceptable manner. The original list included some twenty species. This was decreased because there was not enough money to study all twenty species and because it would be difficult to assess the impact on some species. Many of the deleted species are not represented by the remaining species, for instance, river otters."

"The river otter population on Montague Island is significant, yet the DEIS does not discuss the potential effects of increased trapping, water quality degradation and landslides (which cause death of injury to individuals and habitat loss for the species)."

The management indicator species (MIS) list was developed following the established Forest Service Region 10 process (Sidle and Suring 1986). This process was developed in cooperation with the Alaska Department of Fish and Game, U. S. Fish and Wildlife Service and the National Marine Fisheries Service. The Chugach Forest Plan and associated list of management indicator species was developed prior to the implementation of the regional process and incorrectly included many species that did not meet the requirements set forth in the adopted process.

Using this established process, biologists from the Alaska Department of Fish and Game, U. S. Fish and Wildlife Service, National Marine Fisheries Service and the Chugach National Forest developed the list included in the DEIS. The planning record contains documentation of the development of that list.

The inclusion of river otters as a management indicator species was considered in the process, however, the common merganser was selected as the MIS for species dependent on riparian habitats. Monitoring of the common merganser will provide information of the effects to riparian species including the river otter.

The effects of increased trapping from the proposed actions has been included in chapter 4 of the FEIS.

"The DEIS also fails to consider the impact on all species of the increased hunting and fishing that will result from increased access."

"...Such restrictions [that ADF&G can place on fish and wildlife harvest levels] **would, of course, have significant impacts on the amount of recreational hunting and fishing, yet nowhere does the DEIS acknowledge this. (The DEIS does acknowledge that restrictions may occur, but does not discuss the effects this would have on recreation or the fish resource itself.)"**

The section on the effects of fishing in the DEIS and FEIS includes a discussion of the affects of proposed projects and associated increase in access on the fisheries resource and sportfishing opportunities. Numbers of fish and sportfishing opportunities are not expected to be reduced by actions on Forest Service lands and if the

feasibility studies indicate that fish enhancement projects are feasible fish numbers and sportfishing opportunities are expected to increase.

The management indicator species monitoring plan (Appendix C) will provide additional information on the effects of the proposed actions on wildlife and fish populations. The Forest Service will cooperate with the Alaska Department of Fish and Game to provide information on population trends for use in determining harvest levels.

> **"Finally, the DEIS fails to comply with NEPA in its sketchy assessment of the effects on the wilderness character and wildlife use on road construction in a previously roaded area."**

A discussion of the effects of proposed roading is included in chapter 4 of the DEIS and FEIS for each of the management indicator species.

Vegetation

> **"Estimates of revenues from logging are also suspect, since they are relying on outdated information."**

Estimates of net timber sale revenues as discussed on pages 4-59 through 4-62 of the DEIS are based on the most currently available appraisal data for market values and logging costs. As discussed on page 4-59 of the DEIS, appraisal data for mid-market conditions is base year 1987, adjusted to the third quarter of 1988, and on page 4-60, harvest costs are based on Alaska Region appraisal data adjusted to 1987. At the time of DEIS printing, this was the most current appraisal data that was available from the Forest Service's Alaska Regional Office in Juneau.

> **"It is also important to remember that the overall timber supply in the Prince William Sound area is not all that substantial. On Montague Island itself, there is suprisingly little timber available."**

The Prince William Sound timber supply was addressed in the amended Forest Plan and is beyond the scope of this DEIS.

> **"Logging and road building as described in the other alternatives are not compatible with the primary objectives of recreation, wildlife, and fish habitat. Logging seriously affects the quality of use of these other objectives, ruining it for all."**

Although timber harvest is not explicitly stated as a primary management goal for the management area in the amended Forest Plan, it is a primary management practice for the management area. Compatibility with primary management goals is achieved by either avoiding certain areas for siting timber harvest units or by selecting harvest unit locations which minimize conflicts with the other resources and/or provide opportunities for enhancement of the other resources.

"Although the maps depict areas of strip and stand clearcutting, the method by which areas were chosen is unclear."

"The DEIS does not adequately consider the alternatives to clearcutting, nor does it adequately justify the conclusion that clearcutting is the optimum method of logging."

The planning team prescribed stand or strip clearcutting as the optimum silvicultural system to achieve even-aged management objectives. Shelterwood and seed tree cutting were not prescribed for stands on side slopes that required cable yarding because of the difficultly in using cable yarding without damaging the residual stand. In valley bottom stands that can be tractor yarded, shelterwood and seed tree cutting were considered as options but were eventually dropped because of the potential for windthrow in the residual stand and the recommendation of the wildlife biologist to maintain large blocks of contiguous unharvested timber in valley bottoms during this entry for critical wildlife habitat.

Where the other resource objectives could not be met satisfactorily, such as in riparian zones, individual or group selection will be the silvicultural system used to meet uneven-aged management objectives. The locations where these systems would be applied were not displayed on the DEIS maps due to the map scale used relative to the small size of the riparian buffers where these systems would be applied.

"The Forest Plan and the settlement agreement both say "up to 36 mmbf" will be harvested from Big Islands, but there is no guarantee that they will be"

"The agreement required the Service to "further assess the viability of a renewed timber industry in southcentral Alaska; to further monitor and evaluate the market projections incorporated in the Forest Plan...." (DEIS,A-5). This has not been done in the DEIS."

"Perhaps the most troubling assumption in the DEIS is that the Big Islands Management Area will be the source of no less than 36 million board feet of timber. This ignores not only the language of the amended Forest Plan, which uses the phrase "not to exceed," but the requirement of the settlement agreement to assess the viability of a timber industry in this area. Thirty-six mmbf was clearly meant to be a possible, maximum figure, not a guarantee, but nothing in the DEIS addresses this issue."

Item (I)(A)(4.)(a.) of the Forest Plan settlement agreement (see Appendix A of the DEIS) states "The level of timber sale offering will not exceed an annual average of 6.3 million board feet for the first five years and 10.6 million board feet for the second five years of the Ten-Year Timber Action Schedule attached as Appendix C. This will allow time to further assess the viability of a renewed timber industry in southcentral Alaska; to fur-

ther monitor and evaluate the market projections incorporated in the Forest Plan; and to complete Management Area Analysis for management areas where Forest Service timber harvesting and timber management related road construction activities are scheduled to occur." Appendix C states that the "Big Island" timber sale is planned for fiscal year 1992 on Montague Island and that the estimated volume would be 36.0 million board feet.

The DEIS range of alternatives consider timber harvest ranging from none to 36.5million board feet.

> **"The log clearing that will take place to build the road will amount to between five and ten million board feet. This should be counted toward the total harvest from Montague Island."**

Although not displayed in the DEIS, road right-of-way timber volume was estimated by the Forest Service for each alternative. The assumptions and calculations for determining this volume are located in the planning record.

> **"The DEIS should have included a description of the plans for extensive clearcutting on private lands in the Sound and a discussion of the benefits and detriments of additional logging on federal land."**

> **"The Forest Service should defer logging on public lands to balance the intensive and extensive clearcutting that is planned for private lands on Montague Island and throughout Prince William Sound."**

Addressing timber harvest on private lands outside of the Big Islands Management Area is beyond the scope of the DEIS. To the extent that information was available from private land owners within the Big Islands Management Area, the DEIS addresses planned timber harvest on private lands. This includes an assessment of the cumulative effects of private timber harvest and harvest on federal lands which can be found on pages 4-9, 4-26, 4-27, 4-29, 4-30, 4-36, 4-40, 4-45, 4-50, 4-51, 4-55, 4-60, 4-61, and 4-107 of the DEIS.

> **"The DEIS should have considered that cutting on public lands at this time puts the federal government in competition with private industry, and probably lowers the prices for public timber."**

The federal government is not in competition with private industry by selling timber on federal lands. As a matter of public policy, the federal government makes supplies of raw timber available to the private sector for the production of manufactured wood products and the creation of jobs both in and out of the timber industry.

Federal timber stumpage is appraised using the most current appraisal data for market values and production costs. Timber is then offered and sold to the highest bidder. In

Alaska, the market value of timber is primarily driven by the demand for timber in the Pacific Rim countries like Japan, China and Taiwan.

> **"it is clear that clearcutting on Montague Island would violate 16 U.S.C. 1604(g)(3)(F)(v). That section allows clearcutting only when the cuts are "consistent with the protection of soil, watershed, fish, wildlife, recreation and aesthetic resources, and the regeneration of the timber resource."**

Forest wide Standards and Guidelines, Management Areawide Standards and Guidelines, project level management prescriptions, and site-specific mitigation measures discussed throughout the DEIS adequately provide for the protection of the above mentioned resources within the south Montague Island project area.

In terms of regeneration, previously harvested stands on Montague Island have been successfully restocked by natural regeneration and are in fact, overstocked, which is why these stands are being prescribed for precommercial thinning.

> **"Since approximately 4,000 acres of Montague were logged earlier in this century, one would expect the DEIS to contain some information about the success of reforestation on that property, and the long-term observable effects of that logging on the resources. No such information is presented."**

Forest Service 1978 timber type maps and historical timber sale records indicate that only about 2,053 acres have been previously harvested on Montague Island.

Although not discussed in detail on page 4-62 of the DEIS, past reforestation success and the implications for future reforestation success are briefly covered on page 4-62 of the DEIS. This discussion has been expanded and clarified in the FEIS.

> **"One of the most troubling aspects of the DEIS is its continual reference to the old growth forests of Montague Island as "over mature timber." The bias inherent in this phrase devalues both the forest and those who pretend to be its caretakers.**
>
> **"I heartily agree with your April decision to let the trees stand on Montague."**

The term "over mature timber" is used to describe old growth timber and is consistent with terminology the used in the Chugach Land and Resource Management Plan.

Soils

> **The discussion did not give sufficient detail in the different types of soils and their susceptibility to soil erosion.**

The discussion of soils in this management area analysis was presented at a level that did not get specific to soil erosion other than to say that it would occur if the surface organic material was removed. The amount and intensity of precipitation on Montague Island is such that upon the removal of the protective surface organic layer, all soil fines will erode. The objective of the Standards and Guidelines and Best Management Practices is to retain the organic layer and reduce the potential erosion as much as possible. It was felt for the level of analysis and the information available for the development of the EIS that this level of specificity was appropriate. Greater specificity will be addressed in and Environmental Assessment which will be created specifically for the timber harvests and road construction.

The discussion did not speak specifically or give sufficent strength to the seriousness or the potential for landslides and their consequences.

A more specific discussion will be presented in an environmental assessment following the EIS before the development of any road or timber harvest.

The document failed to assess the effectiveness of the mitigation measures.

The effectiveness of the mitigation measures relative to each of the timber harvest units is recorded in Appendix H of the FEIS.

The report did not discuss the need to adhere to the stringent state water quality standards.

The adherence to the state water quality standards for the implementation of any projects on the forest is stated in the standards and guidelines.

The DEIS did not contain any water quality analyses.

It was determined that for the level of specificity of the EIS, analysis of the water quality was not necessary. Upon the analysis of specific projects or the implementation of specific projects analyzed in and environmental assessment,water quality analyses will be obtained.

There was no discussion of the effects of debris torrents.

Your suggestion of debris torrents is now discussed under the topic of surge releases in the affected environment section (CH.2).

Document Deficiencies

Several comments criticized the level of detail in in the DEIS with regard to NEPA requirements.

The level of detail has been increased in the Final EIS. Refer to Standards and Guidelines in Appendix F for details on the analysis.

> **"Based on our review we have rated the draft EIS EC-2 (environmental concerns-Insufficent Information). Our review has identified issues which may require changes to road construction or application of additional mitigation measures or monitoring."**

A section in the settlement agreement directs the Forest Service to complete further NEPA documentation on the road prior to construction.

> **"While the MAA may be tiered to the Forest Plan, it is not understandable to expect the DEIS to contain at least some minimal statement that the assumptions in the Forest plan remain--valid or that in reexamining them over time, the Forest Service has noted that they not longer apply because of changed conditions."**

The analysis for MAA did examine the changed conditions, and the results are disclosed in chapter 4.

Planning Process

> **"Indeed, the Forest Service is required to prepare a Supplemental Environmental Impact Statement when "(t)here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 CFR 1502.9(c)(1)(ii)."**

> **"In light of the changed situation which certainly constitutes a "significant new circumstance", it is incumbent upon the Forest Service to issue a Supplemental EIS which incorporates information about the oil spill and assesses the cumulative impacts caused by further disturbance."**

> **"As an alternative, a supplemental EIS could be prepared."**

The analysis of the effects of the oil spill by the interdisciplinary team indicate there are no additional effects on the resources that would change proposed activities to implement the Land and Resource Management Plan in the Big Islands Management Area. The discussion of this analysis is disclosed in the document in Chapter 4.

> **"Approval of the road in isolation from all other determinations was not presented as an alternative in the DEIS and has not been subject to public review."**

> **"Separating the road from the rest of the plan is an abuse of the planning and public participation processes."**

5 Public Participation

The purpose of the Draft Environmental Impact Statement is to disclose to the public the environmental impacts of proposed actions. The impacts of the road alternatives are disclosed in the document for the public to review and comment. The effects of each individual road alternative are site specific to the degree that a decision maker could select a road from an alternative while not selecting any other actions. This would not violate NEPA since the effects were disclosed in the DEIS.

> **"Public meetings that you have scheduled for this matter will only provide local opinion while the great majority who do not reside in Alaska will not have the opportunity."**

Public meetings were one of several methods used to inform the public about the MAA and to allow opportunity to comment on the Draft Environmental Impact Statement. See the introduction to this chapter for a discussion of public involvement.

> **"The Forest Service should not, at this time implement any management practices that could further adversely effect the environment of Prince William Sound."**

> **"It is an inappropriate time for development of public lands in Prince William Sound."**

> **"No reasonable conservation alternative is included."**

The analysis completed by the interdisciplinary team does not indicate it would be inappropriate to implement management activities within the Big Islands Management Area at this time. The analysis clearly displays there would be no further adverse effects on the environment from the activities proposed to implement the Forest Plan. This analysis is developed in Chapter 4 of the document.

> **"The absence of an alternative that combines appropriate recreation, habitat enhancement and preservation of roadless areas with no logging or non-intensive logging is a serious flaw in the DEIS."**

The analysis was guided by the scoping from the public involvement. The range of alternatives in the document was based on an analysis to address the issues raised by the public and management as part of the NEPA process. The range of alternatives in the document addresses the planning issues by displaying alternative methods of implementing the Land and Resource Management Plan through the NEPA process.

> **"The Forest Service cannot abdicate its responsibility under NEPA just because no member of the public brought the issue to the agency's attention. Water quality is always an issue in timber planning; no EIS that fails to consider it can be valid."**

See Appendix F for an analysis of the water quality impacts.

> **"If, as your staff informed me, the Forest Service's regulations are the stricter of the two, there should be no problem in obtaining the State's permit. If the State's regulations are stricter, we feel it is incumbent upon the Forest Service to abide by those restrictions as any other property owner in the state would be required."**

The Forest Service is not required to obtain any state permits to conduct management activities on National Forest System Lands.

> **"Rather, the DEIS merely assumes that the timber should be cut to achieve a general goal set in the Forest Plan. This violates section 6 (k) of NFMA, as well as NEPA and the Forest Plan Settlement Agreement."**

The amended Land and Resource Management Plan sets the allowable sale quantity for the Forest. The management area analysis process develops where and how to manage timber within each management area to meet this quantity. The effects of harvesting various levels of timber are disclosed in the document and a process for this analysis was developed by the timber specialist on the interdisciplinary team as per the National Environmental Policy Act.

> **"NFMA also allows timber harvest only when streams can be protected from sedimentation, channel obstruction and water temperature changes if harvests are likely to cause serious effects on water or habitat. 16 U.S.C. 1604 (g)(3)(E)(iii). Thus this defect in the DEIS violates not only NEPA, but also NFMA."**

The standards and guidelines in the Land and Resource Management Plan and Appendix F of the EIS were developed based on the analysis and the design of the projects is based on these standards and guidelines so as to protect the streams from sedimentation, channel obstructions and water temperature changes.

> **"The DEIS leads one to conclude that the No Action alternative did not receive serious consideration, but was only included nominally to fulfill a legal obligation."**

In the analysis, alternatives were developed and analyzed equally by the interdisciplinary team as required by the National Environmental Policy Act. All alternatives are considered reasonable and are based on a process developed by the interdisciplinary team to address the issue raised during scoping. The interdisciplinary team makes a recommendation to the deciding officer on an alternative. The deciding officer selects the preferred alternative based on the information disclosed in the final environmental impact statement.

Economics

> **"Had the DEIS disclosed the relevant information about the mill, it would have been clear, despite the mill owners, alleged reliance on the Forest Plan timber projections, that logging on private lands will provide more that enough timber to support the mill. This requires a rebalancing of the costs and benefits of the proposal."**

This mill was assumed to be a delivery point for volume from National Forest System Lands. This mill will exist where there were only small sawmill operations without the capacity to handle large volumes of timber. The costs and benefits in the analysis are based on the needs for management of the National Forest System Lands. The costs were developed to display the effects of National Forest management within this management area from proposed actions so an informed decision would result.

> **"The Forest Services's refusal to grant a reasonable request for extension under these extraordinary circumstances can only be viewed as capitulation to private commercial interests without appropriate regard for the public which the Forest Service is suppose to serve."**

The thirty day extension was granted to allow the public additional time to comment on the DEIS due to the incident in Prince William Sound.

Recreation

> **"In its discussion of access, the DEIS posits an enormous increase in recreational opportunities as a result of the road and the resultant phenomenal increase in "RVDs. But the DEIS never mentions that the quality of the experience for these visitors will be greatly diminished, nor does it either recognize or attempt to quantify the number of current visitors who will no longer make use of the island <u>because</u> of the road."**

> **"The assumption that the road will benefit recreation opportunities is unfounded. What about the recreation use that will be displaced due to the loss of wilderness character caused by the road?"**

> **"...the Forest Service's projections about increased recreation are based on faulty assumptions."**

> **"It is most unlikely, for instance, that a remote area with little or no non-hunting/fishing use will suddenly see a huge increase in such use."**

> **"Given the remoteness of the Big Islands Management Area, it is unlikely that the 115% increase in recreation projected under Alternative 5 is anything more than an unsubstantiated hope and/or a rather obvious maneuver to create a positive net value for the Forest Service's preferred alternative to avoid the label of 'below cost sale'."**

The recreation opportunities displayed in alternative 5 were put forth based on the premise that Prince William Sound (PWS) has significant recreation potential to contribute to the growth in recreation and tourism in southcentral Alaska (DEIS, chapter 2, page 47). Cruise ship visits to Prince William Sound have grown tremendously in the past several years.

Clearly PWS is an area of exceptional beauty and of great value as a recreation resource. There are any number of ways to make these opportunities available to the general recreating public ranging from doing nothing (No Action alternative) to providing or improving facilities to make access and visitor stays easier. Alternative 1 (No Action) and Alternative 5 are at opposite ends of the spectrum. The other alternatives propose development levels somewhere in between.

> **"I don't understand the argument behind more shelter cabins, platforms, and trails. All these islands, except for Hawkins, have extensive beaches with ample room for tents and these beaches make excellent trails. What ever happened to walking, anyway? I hope these thoughts are taken into consideration when the final decision is made."**

The demand for more recreation cabins was addressed in the DEIS, chapter 3, page 16. Within the Big Islands Management Area, there is a greater demand for cabin use than we have availability. This is especially apparent on Montague Island." The number of requests for cabin reservations which are turned down because of unavailability is documented in the planning file in the Recreation Resource report. For example, 70 requests for the Nellie Martin cabin, 20 for the Log Jam Bay cabin and 15 for the Beach River cabin could not be fulfilled in 1986.

Some people prefer the comfort of the public recreation cabins. Such cabins provide recreation opportunities at one end of the spectrum. Additionally, the experience of Forest Service personnel and visitors on Montague Island is that the weather often dictates that more substantial shelter than a tent is required. The beaches are still available for those who prefer tent camping. As shown on maps 5,7,9,11 and 13 in the DEIS, no trails have been proposed on the beach. The trails proposed are to provide better access to the alpine areas from the beaches or roads for hunters and others.

> **"If cabins are built in these bays, they should be sited at locations which are not already major boat anchorages. Since most cabin usage would probably be by people dropped off by airplane, the cabins would not need to be at the boat anchorages."**

> **"This use is concentrated in the few safe boat anchorages in these bays. The plan as it now stand would place cabins RIGHT AT THESE SAME ANCHORAGES which would only further concentrate usage in these areas."**

"...new cabins to be built in Zaikoff or Rocky bays on Montague Island. I am against this idea for the following reasons. First, the use of these bays is already heavy during hunting season."

Concerning the cabin, anchorage and Zaikof Bay, the current recreation site inventory shows one anchorage and one potential cabin site in Zaikof Bay. They are right next to each other. Apparently the number of good anchorages in Zaikof is limited. The number of cabin sites have not been fully explored. The one shown on the inventory and on DEIS Map O, has float plane and wheeled landing access besides being a good cabin site and all have been field verified. We would agree that the best alternative for a public recreation cabin location would be one that is NOT in essentially the same location as the anchorage which is frequently used by hunters.

Of all eight cabins proposed, only Zaikof Bay shows a recommendation for the cabin in the same place as the only anchorage. Rocky Bay cabin (already in place as an administrative cabin) is near an anchorage but there are two additional anchorages.

As far as concentrating use, which is already "heavy" during hunting season, the maximum capacity of the cabin is six persons at one time, so that would be the most that is added at any given time.

"Why is the Forest Service proposing to construct, at great cost and potential environmental harm, a trail to amuse lodge guests?"

"While the notion of public/private coordination is admirable, this sort of public subsidy of private commercial activity of questionable appropriateness on Montague Island cannot be justified by that concept."

We share some concerns about potential resource impacts from the proposed ATV trail. These will be considered when the route is field verified prior to implementation.

"The DEIS does not comply with this requirement in its three-quarters of a page section on Roadless Character."

"For some of the impacts of roading that require consideration, see sections II and IV, supra. In addition, the Forest Service must consider the effects of the loss of roadless character for its own sake, as wilderness."

"The section contains no analysis or consideration of benefits and detriments of roading South Montague Island."

Additional documentation for Chapter 4 under Roadless Character has been added.

The roadless character section in the DEIS, chapter 4, page 123, concludes that roadless character could be regained through rehabilitation and one commentor feels this is unsubstantiated.

The DEIS does not provide rationale for this conclusion. There are a variety of methods for rehabilitating roads to regain the natural character. Some of these include removing all man-made improvements (bridges, culverts, road base, etc.), grading to regain the natural contours, fertilizing and seeding with naturally occurring vegetative species. The DEIS concludes that appropriate rehabilitation methods of the type described here could be used to regain roadless character which would occur over time.

In alternative 7, it is appropriate to describe methods for restoration of the roaded area to its natural character as it is intended to obliterate the road after use by CAC. The description of those requirements, which will be included in the special use permit clauses, is shown in chapter 2 of this document under Mitigation Specific to Alternative 7.

> **"We also request that the state's Prince William Sound Area Plan be referenced in the EIS."**

The Prince William Sound Area Plan was referenced in the DEIS, chapter 7, page 1.

Wilderness

> **"These three bays [Port Etches, Zaikof Bay, and Rocky Bay] really go together and form a core of wilderness for the Eastern Prince William Sound. This wilderness is needed to provide for continued wilderness hunting and camping for the people of the Eastern Sound, and those Americans who want a true wilderness alternative. There are already other areas for those who desire semi-developed recreation."**

Generally, a Forest Service document which uses the term "wilderness character" is referring to National Forest System lands which have been designated or recommended for designation under the 1964 Wilderness Act. For undeveloped areas not designated by congress, the usual term is primitive. The status of Wilderness on the Chugach National Forest is described in the DEIS in chapter 3, page 35 under Roadless Character. If the commentor is referring to basically primitive character, the response to 31/6 (91) is applicable.

> **One comment offered an opinion that for persons using a small boat in the Cordova area, Port Etches, Zaikof Bay and Rocky Bay form a circle of wilderness and should be maintained in its "wilderness character".**

The Settlement Agreement allowed for primitive character to be maintained on Hinchinbrook Island (which includes Port Etches) but did not specify the north end of Montague. Further, installing a public recreation cabin and/or an anchor buoy would still maintain the primitive character as defined by the Recreation Opportunity

Spectrum (ROS), although it is acknowledged that not everyone would agree on that point.

> **"Big Islands Wilderness to included 396,000 acres, plus the surrounding water of the Prince William Sound, Gulf of Alaska, some 1,024,000; to total(at least) 1,400,000 acres, and as a part of our National Wilderness Preservation System."**

The Forest Service evaluated lands as to their suitability for wilderness during the development of the Land and Resource Management Plan and submitted a recommendation in the form of a legislative environmental impact statement. This is considered land use allocation. Management Area Analysis is to disclose to the public and the decision maker the effects of implementing projects rather than developing land allocations.

Cumulative Effects

> **"Plans for logging on federal lands must be evaluated in relation to proposed activity on private lands."**

> **"No where, does the document address the relationship of management decisions on Montague Island to Prince William Sound as a whole."**

The effects of activities in the alternatives proposing coordination with the private land owner include an analysis of the cumulative effects of the proposed activities on private lands in relation to activities on the National Forest. The analysis also examines the effects on the management area since this is where we are proposing to implement the Land and Resource Management Plan.

Subsistence

> **Cordova and Tatitlek both use the Zaikov Bay area, where a cabin is proposed. Cordova and Tatitlek will not benefit substantially from this cabin. Instead, it will attract non-rural fly-in hunters, thus increasing competition.**

The DEIS at 4-114 discussed the potential to increase competition and estimated a cabin at Zaikof Bay could increase non-resident use by 100-200 user days during the hunting season.

> **At a minimum, the DEIS should identify data gaps (to subsistence uses of resources) and specify how they are being addressed. A discussion as to whether these deficiencies affect the ability of the DEIS to adequately evaluate the possible effects of the proposed actions would be helpful.**

There is limited information on subsistence use by the residents of Tatitlek. Customary use areas have been mapped but the intensity of use for areas or species is not known. It does not appear, from the information available, that there is significant use of the south end of Montague Island where most of the proposed actions are concentrated.

Intensity of use information by resource is available for residents of Chenega Bay and Cordova. However, levels of use for different areas is not presently available. There is information on levels of use for deer but not for other resources.

> **Some pre-commercial timber cutting would occur on the west side of Montague Island in an area used by the community of Tatitlek and possibly Cordova for deer hunting. Such cutting would severely impact deer hunting in this area for some time.**

Second growth stands do not receive nearly as much use by deer as old growth stands. The precommercial thinning operations would be designed to improve the areas suitability for deer. The thinning operations are not expected to have any negative impact on the deer habitat or subsistence use of the area.

> **The potential for subsistence uses being disrupted is not addressed in this section (Ch 4).**

Chapter 4 contains a specific finding on page 4-115 of the DEIS that discusses the potential for subsistence uses being disrupted.

> **A more informative and desirable presentation would look specifically at subsistence uses of the study area by Cordova, Chenega, and Tatitlek, including the species harvested, modes of access, seasonality and levels of harvest, and related information. Little information is provided on the use of marine mammals by study area communities, and what the effects of the proposed action might be on marine mammal habitat and harvest opportunities.**

The DEIS summarized information collected by the Alaska Department of Fish and Game on subsistence uses by the residents of Cordova, Chenega Bay and Tatitlek. Species harvested and levels of harvest as well as areas of harvest were reviewed and is summarized in the EIS. More detailed information can be found in the documents referenced in the EIS.

> **"We recommend that another question be added to the list: 'What might be the effects on subsistence uses of increasing recreational user days?'"**

While this question was not specifically formulated as an analysis question, Section 810 of ANILCA requires an evaluation of the effects of use, occupancy or disposition of public lands on subsistence uses and needs. Increased recreation use is a use of the National Forest as a result of the proposed action and alternatives is one of the uses

that was evaluated as part of the Subsistence evaluation and Finding. Page 4-113 and 4-114 discuss the Potential to Increase Competition.

> **At a minimum the plan should evaluate the possible effects of habitat enhancement on subsistence fishing and on fishery resources used for subsistence purposes.**

The fish enhancement opportunities are located at the south end of Montague Island. This area, as has been addressed in the DEIS, is currently receiving very low use by subsistence users, especially for fish resources. The enhancement opportunities, if they should prove to be feasible would targeted for both the commercial and sport fish. Many of the fish taken for subsistence uses in Prince William Sound are come from commercial harvests. Any improvement to the commercial harvest by the enhancement would probably support subsistence uses as well. The sport fish enhancement projects, designed to improve habitat for coho salmon would provide minimal opportunities for subsistence resource harvest. The distance involved to the user communities already make areas closer to the communities much more appealing.

United States Department of the Interior

GEOLOGICAL SURVEY

Branch of Alaskan Geology
4200 University Drive
Anchorage, Alaska 99508-4667

TAKE PRIDE IN AMERICA

April 6, 1989

Memorandum

To: Chugach National Forest

From: Associate Branch Chief

Subject: Comments on Draft EIS Big Islands Management Area

The following are my comments, by page number, on the DEIS with respect to sections on the geology and mineral resources:

1. Chapter 2, p. 8 - "Nelson et. al., 1988" reference in the second paragraph. The correct date is 1984.

2. Chapter 3, p. 3 - "Nelson and Jansons, 1984" is the wrong reference for the geology of the CNF. The correct reference is:

   Nelson, S.W., Dumoulin, J.A., Miller, M.L., 1985, Geologic map of the Chugach National Forest, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-1645 B.

   This is in the Literature Cited section but was not referenced in the text.

3. Literature Cited, p. 5 - References by Nelson et. al., 1984 and Jansons et. al., 1984 should be listed individually by author. On page 5 they are run together after an earlier reference.

4. The discussions and evaluations of the geology and mineral resources for the Big Islands area seems appropriate based on existing published information. I did notice however that several of the management alternatives allow for logging road construction on Montague Island. The maps show the proposed routes being constructed along or across several active fault zones and yet there is no discussion, in chapter 4 of the DEIS, regarding the potential hazards or construction difficulties related to road construction along an active fault.

Steven W. Nelson

STATE OF ALASKA

STEVE COWPER, GOVERNOR

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

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March 15, 1989

RE: Big Islands Management
Area Draft EIS

Dalton Du Lac, Forest Supervisor
Chugach National Forest
U.S.D.A. Forest Service
201 E. 9th Avenue, Suite 206
Anchorage, Alaska 99501

RECEIVED
MAR 17 1989

Dear Mr. Du Lac:

The Department of Transportation and Public Facilities (DOT&PF) has completed its review of the draft Environmental Impact Statement for the Big Islands Management Area of Chugach National Forest.

DOT&PF presently has no transportation facilities planned for Montague Island, Hinchinbrook Island, or Hawkins Island. We note that the Big Islands Management Area includes provision for the development of such facilities to serve this popular recreation area in Prince William Sound. It is our understanding of the draft EIS that the road system, airstrips, and harbor facilities within Chugach National Forest which are proposed by this document would not be part of the public transportation system and would be financed, constructed, maintained, and controlled by a private corporation under permit from the U.S. Forest Service.

Thank you for the opportunity to review this draft EIS for the Big Islands Management Area of Chugach National Forest.

Sincerely,

L. Kay Schmidt
Regional Planning Manager

JHH/ldm

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

MAY 31 1989

REPLY TO
ATTN OF: WD-136

Dalton Du Lac
Forest Supervisor
Chugach National Forest
201 East Ninth Avenue
Anchorage, Alaska 99501

Dear Mr. Du Lac:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, we have reviewed the Draft Environmental Impact Statement (draft EIS) for the Big Islands Management Plan. The draft EIS describes the management activities for the 314,000 acre Big Islands Management Area. The management area includes Hawkins, Hinchinbrook, Montague, Green, Little Green, and Wooded Islands and The Needle all located in the Prince William Sound of southcentral Alaska.

Based on our review we have rated the draft EIS EC-2 (Environmental Concerns -Insufficient Information). Our review has identified issues which may require changes to road construction or application of additional mitigation measures or monitoring.

The draft EIS states that the Chugach Alaska Corporation will clearcut harvest 2,650 acres in 14, 13, and 47 percent of the land in the anadromous portions of MacLeod Creek, Nellie Martin River, and Beach River respectively on Montague Island. This will significantly reduce habitat capability and affect the harvest levels of the Forest Service in those same watersheds (page 4-26). The draft EIS further states that proposed road construction by the Forest Service will not cause significant incremental reductions in habitat capability in MacLeod Creek and Nellie Martin River. Because of the sensitivity of these watersheds the final EIS should include a detailed description of implementation monitoring. Also, can road mileage and crossing in the streamside habitat zone be reduced in these watersheds to reduce any potential cumulative effects?

The draft EIS uses number of road miles and stream crossings as the lead indicator of effects to fish and fish habitat (pages 4-11 to 4-25 and Appendix E). Although useful information for comparison of alternatives, the draft EIS does not indicate whether management activities will cause Alaska Water Quality Standards to be exceeded for temperature, turbidity, or sediment. This needs to be explained.

The monitoring plan for Pink Salmon, Coho Salmon, and Cutthroat Trout seems to rely on population estimates for effectiveness monitoring (pages C-12

to C-15). Results from population monitoring could be misleading for anadromous fish with potential outside influences like the effects of the Exxon oil spill. Monitoring methods which evaluate habitat or a combination of habitat factors may be a more appropriate indicator of the effects of management activities.

Thank you for the opportunity to review this draft EIS. Should you have any questions about our comments, please contact Wayne Elson at (206) 442-1463.

Sincerely,

Ronald A. Lee

Ronald A. Lee, Chief
Environmental Evaluation Branch

cc: Dan Wilkerson, ADEC - Anchorage

United States Department of Agriculture | Forest Service | Alaska Region S&PF | 201 E. 9th Ave. Suite 206 Anchorage, AK 99501 907-271-2575

Reply to: 1950

Date: May 24, 1989

Subject: Big Islands Management Area Draft EIS

To: Forest Supervisor, Chugach National Forest

Both the Forest Pest Management and Fire Management groups reviewed the Draft Environmental Impact Statement for the Big Islands Management Area. Gene and Dennis are committed to Forest Planning. However, to be effective they need to be brought into the planning process from its inception. We hope the following comments are constructive and of value to you in the preparation of the Final EIS.

The text is extremely difficult to follow. The following editorial comments explain the main determent to readability.

Maps and tables appear to be inserted at random. For example map 36 (pg 2-12a) and map 37 (pg 2-12b) follow map 2 (pg 2-9) and are inserted before maps 29-35 (pgs 2-35 to 2-41); tables 2-4a and 2-4b should be associated with Alternative 3 pg 2-42; tables 2-5, 2-6, 2-7, and 2-8 are similarly misplaced. Maps and tables should be labled in order of their appearance in the text. In addition, maps and tables should follow directly after their first reference in the text.

Maps and tables should stand on their own. The reader should not have to guess at the title for a table (Tables 2-9); or, be subjected to 7 pages of "key for interpretation of the tables" on pages 2-17 through 2-23; or, be confronted with 3 pages of tables (table 4-1, 4-2a, and 4-2b) with numbers that are "indicies" by the title but "miles" or "acres" along the axis. All maps, tables, and figures should be discussed in the text. For example, figure 3-3 (pg 20-3) is not addressed in the text. Table 2-2 is not fully discussed in the text (pg 2-12) "Feasibility studies would be completed on four potential ...". We suggest that a table be created specific to each alternative.

Remove all references to the Forest Service "owning land" (Table 3-1, pg 3-2). Public agencies administer lands.

Caring for the Land and Serving People

FS-6200-28(7-82)

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
1689 C STREET, ROOM 119
ANCHORAGE, ALASKA 99501-5126

TAKE PRIDE IN AMERICA

ER 89/277

MAY 23 1989

Mr. Dalton Du Lac
Forest Supervisor
Chugach National Forest
201 East Ninth Avenue
Anchorage, Alaska 99501

Dear Mr. Du Lac:

In response to your request dated March 3, 1989, we have reviewed the Big Islands Management Area Draft Environmental Impact Statement. We offer the following comments for your consideration.

In Chapter 2, page 3, Withdrawal of lands from mineral entry, we suggest the stated rational be expanded. Occurrences of manganese and copper in the planning unit have been documented, although none have proven to be of commercial value to date. Leaving the area open to mineral entry will allow for the further exploration for mineral commodities, some of which are of strategic and critical importance.

In Chapter 3, page 3, Minerals and Geology, the last sentence of the second paragraph should read: "There is also one other mineral occurrence on Hinchinbrook Island that contains manganese". The third paragraph can be deleted as there are no known gold occurrences along the eastern shore of Hinchinbrook Island. Note the spelling of Fechner.

On the same page, it may be interesting to some readers to include the time frame over which the 24 earthquakes exceeding Richter Scale 5.0 occurred. Also, a simplified map of known mineral occurrences in the planning area may be helpful. A table summarizing the characteristics of each deposit could be included (see Bureau of Mines MLA report 5-84).

The discussion of cultural resources found in the Affected Environment and Environmental Consequences sections of the EIS is very general. We recommend the discussion be expanded to reflect consideration of resource significance as found in the Cultural Resources Overview of the Chugach National Forest. The Affected Environment, Chapter 3, provides only a brief summary of known cultural resources with no discussion of their importance. Site

STATE OF ALASKA

STEVE COWPER, GOVERNOR

OFFICE OF THE GOVERNOR

DIVISION OF GOVERNMENTAL COORDINATION

STATE CSU COORDINATOR
2600 DENALI STREET, SUITE 700
ANCHORAGE, ALASKA 99503-2798
PHONE: (907) 274-3528

May 24, 1989

24

Mr. Dalton DuLac
Forest Supervisor
Chugach National Forest
201 E. Ninth Avenue, Suite 206
Anchorage, AK 99501

Dear Mr. DuLac:

The State of Alaska has reviewed the Big Islands Management Area Draft Environmental Impact Statement (DEIS). This letter contains the consolidated comments of state agencies.

Background

Chugach Alaska Corporation (Chugach) owns commercial timber land on Montague Island. Chugach seeks U. S. Forest Service (USFS) authorization to construct approximately 35 miles of road from a log transfer facility site in MacLeod Harbor to its timber lands in the Patton Bay-Beach River area. Chugach has concluded that a log transfer facility (LTF) in Patton Bay is not economically feasible. High wave energy on the east coast of Montague Island apparently requires considerably greater costs to construct and maintain an LTF in Patton Bay than the costs of constructing a road and hauling timber to MacLeod Harbor. Chugach has argued that the USFS is obligated to provide reasonable access to their lands which were aquired under the Chugach Region Study Agreement pursuant to the Alaska Native Claims Settlement Act (ANCSA) and Section 1430 of ANILCA.

The USFS is entitled, under terms of a negotiated settlement with appellants of the Chugach National Forest Land and Resource Management Plan, to harvest up to 36 mmbf from the Big Islands Management Area. However, before harvesting this timber or making any other significant resource management decisions in this area, the USFS is required by the negotiated settlement and applicable federal laws to evaluate the impacts of their proposed decisicn and to balance the needs of all forest resources, including fish and wildlife, to achieve multiple use.

The Preferred Alternative

Originally the USFS preferred alternative (Alternative 5) included, among other things, proposals authorizing construction

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of a 35-mile access road linking private lands at MacLeod Harbor and Patton Bay, 28 additional miles of spur roads to access timber stands on public lands, harvest of 36 mmbf of old-growth timber on 1,151 acres of public lands, recreational improvements, and fish habitat enhancement. On April 19, however, the USFS announced that the new preferred alternative has been narrowed to include only a special use permit to Chugach for the access road between MacLeod Harbor and Patton Bay. This change, as well as an extension of the original DEIS comment period, occurred as a result of the Exxon Valdez oil spill.

State Recommendation

Based on a review of the DEIS and the state agency observations of impacts from the oil spill, the state supports the approval of a special use permit for a road between MacLeod Harbor and Patton Bay subject to the following stipulations:

- the road shall be temporary and used solely for the purpose of one-time entry to harvest timber (estimated eight years) on privately-owned Chugach lands, and the route be restored and rehabilitated following harvest; and
- all stream crossings of fish habitat be installed and maintained during road use pursuant to Title 16 Permit requirements, and removed with the roadbed when no longer needed.

The state further recommends that additional proposals for supplemental access to USFS lands for timber harvesting and developed recreation not be approved at this time. Such proposals on public lands should only be further considered after a regional analysis of oil spill impacts and recovery trends to determine what role south Montague Island may have in replenishing diminished populations that may be important to the general recovery of Prince William Sound. Fish enhancement proposals identified in Alternative 5 that could be accomplished under the above recommendation should be retained.

The state's recommendation is based on the following rationale:

- The primary objective of this decision-making process is to address reasonable access to Chugach lands. The conditional special use permit accomplishes this.
- Chugach's private holdings around Patton Bay contain some of Montague Island's best timber lands and wildlife habitat. Since these areas are slated for clearcutting, the USFS should dedicate adjacent public lands to mitigate expected impacts by emphasizing habitat protection until and unless additional analysis demonstrates that development would be

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environmentally sound.

- Preliminary data indicate that bald eagle and marbled murrelet populations in Prince William Sound may have been significantly affected by the oil spill. These two species are old-growth dependent and would be impacted by logging and associated disturbances. Because south Montague Island received only light oiling while other southern and western portions of the Sound were heavily or moderately oiled, the maintenance of healthy populations in this area through protection of their habitat on Montague may be critical to the recovery of wildlife in the Sound.

- Since the long term effects of the spill can only be estimated at this time, additional analysis at a later date would provide more definitive data about the recovery of the Sound and Montague Island's ability to assist in the recovery. While data is not available, permanent road development and other improvements at this time may place undesirable stress on populations that may already be strained by the spill.

- The state's recommendation fully complies with the spirit and intent of the Governor's recent Administrative Order 112 (Attachment I) concerning recovery of Prince William Sound following the oil spill.

- Over 24 anadromous fish streams occur from MacLeod Harbor to Patton Bay. Although the commercial fishery values of these streams are relatively low compared to other districts in Prince William Sound, they contribute to the overall commercial fisheries harvest. Several of the streams, including the Nellie Martin River and San Juan River, have high recreational fishing values. These streams currently provide a relatively unique opportunity for wilderness recreational fishing using wheel plane access. Developing road access to these streams will diminish wilderness angling opportunities for wheel plane recreationists. Streams on south Montague were apparently minimally affected by the oil spill and thus their importance to fisheries in the Sound may increase, particularly if portions of the Southwest District are closed this year to commercial fishing because of oil contamination. Stream habitats could also be adversely affected by stream crossings and by logging. Impacts from stream crossings could be mitigated through adherance to Title 16 permitting requirements.

- Since the Chugach National Forest Land Management Plan is already scheduled for update and revision in 1994, this may be an appropriate vehicle for addressing long-term developments on public lands on Montague Island. As an alternative, a supplemental EIS could be prepared.

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Environmental Impact Analysis

The state believes that the environmental impact analyses in the DEIS concerning fish and wildlife populations and habitat is inadequate. Specifically, some statements in the document contradict other statements, available data are not always appropriately utilized, and some of the conclusions are questionable. These concerns are discussed in detail in the Alaska Department of Fish and Game's technical comments (Attachment II, enclosed).

Use of Tidelands

As the Forest Service is aware, the state believes that based on the Utah Lake decision, tidelands adjacent to the National Forest are state owned. This issue is currently in Superior Court and our comments here do not address tidelands ownership. However, the state notes that any proposed use of tidelands (e.g. log transfer facility) would not be binding upon the state. The state would address utilization or non-utilization of tidelands during the normal adjudication and permitting process. We also request that the state's Prince William Sound Area Plan be referenced in the EIS.

Alaska Coastal Management Program

The state has completed a preliminary review of this document in light of the Alaska Coastal Management Program (ACMP). Based on the information presented, it appears that the plan will be consistent with the ACMP. A conclusive review will be made after the final EIS has been issued for public review.

Thank you for the opportunity to comment on this plan. If you have any questions, please do not hesitate to call this office.

Sincerely,

Robert L. Grogan
Director

by: Sally Gibert
State CSU Coordinator

Enclosure

csu3/27

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
WASHINGTON, D.C. 20240

RECEIVED
TAKE PRIDE IN AMERICA

In Reply Refer To:
ER-89/277

APR 7 1989

RECEIVED
APR 13 1989

Mr. Dalton Du Lac
Forest Supervisor
Forest Service
U. S. Department of Agriculture
201 E. 9th Avenue, Suite 206
Anchorage, Alaska 99501

Dear Mr. Du Lac:

This is in regard to your transmittal of March 3, 1989, requesting the Department of the Interior's review and comments on the draft environmental statement concerning the Big Islands Management Area, Chugach National Forest, Alaska.

This is to inform you that the Department will have comments but will be unable to reply within the allotted time as we have just received your submittal of duplicate copies to satisfy our intradepartmental distribution needs. Please consider this letter as a request for an extension of time in which to comment on the statement.

Our comments should be available about May 10, 1989.

Sincerely,

John H. Farrell
Acting Director

STATE OF ALASKA

OFFICE OF THE GOVERNOR

DIVISION OF GOVERNMENTAL COORDINATION

STEVE COWPER, GOVERNOR

STATE CSU COORDINATOR
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April 7, 1989

Mr. Dalton Du Lac
Forest Supervisor
Chugach National Forest
201 E. Ninth Avenue, Suite 206
Anchorage, AK 99501

10 1989

Dear Mr. Du Lac:

On behalf of the State of Alaska, I urge that the Forest Service formally extend the public comment period on the Big Islands Draft Environmental Impact Statement (DEIS) an additional 90 days beyond April 24, 1989.

In light of the unprecedented oil spill in Prince William Sound, most state employees with knowledge and expertise in the area are devoting their efforts to numerous spill-related activities. Similarly, many local residents and fishermen who use the Sound are obviously caught up in their own immediate needs to respond to the spill. Without additional time for public and state agency review, the Forest Service will not benefit by the amount and breadth of input that is normally received in response to a DEIS of this type. A 90-day extension will provide a minimum amount of time for adequate response.

Thank you for your consideration. I would appreciate hearing of your decision in this matter as soon as possible.

Sincerely,

Sally Gibert
State CSU Coordinator

cc: Robert L. Grogan, DGC
Commissioner Dennis D. Kelso, DEC
Commissioner Lennie Gorsuch, DNR
Commissioner Don W. Collinsworth, DFG

List of Respondents

L. Kay Schmidt, AK.Department of Transportation & Public Facilities

John W. Hendrickson, Alaska Waterfowl Association

Marilyn Leland, Cordova District Fishermen United

Gilbert L. Urata, DMD

Donald E. Sherwood, Alaska Boating Association

Patti J. Saunders, Alaska Center for the Environment

Clarence Petty

Steven W. Nelson, Branch of Alaskan Geology, US Geological Survey

Sally Gibert, Division of Governmental Coordination

John Schultz

John H. Farrell, Office of Environmental Project Review, Department of the Interior

Lester Black

Darren Rorabaugh

Jack Hession, Sierra Club

Mark G. Meehleis

Susan H. Faulkner

Paul Twardock

Charles S. Faulkner II

Mary Lou Wilcox

George Palmer

Thomas S. Ward

Paul M. Tweiten, Chugach Alaska Corporation

5 Public Participation

Cathy R. Sherman

Vincent McClelland

Becky L. Gay, Executive Director Resource Development Council

John R. Swanson

Susan Danver

Richard DeBusman

Tom Copeland

Oliver Osborn

Alison Cojocar

Stephanie A. Kessler

Tim Conlan

Steve Eagleson, Prince William Sound Conservation Alliance

Shirley Ann McGrath

Cleve Cowles

Don A. Ford, National Outdoor Leadership School - Alaska

Cliff Eames, Alaska Center for the Environment

Steve Kallich, Southeast Alaska Conservation Council

Emily Barnett, Sierra Club

Bruce Good, Prince William Sound Conservation Alliance

Betty Bang

Steve Ranney

B. Chapek

Ms. Rocky Stone

Cordova Petitions 132 signatures

Pete Mickelson

Jacob L. Rilling

Karen Jettmar, Wilderness Society

Paul Gates, USDI Environmental Project Review

Marsha Hodson

Belle Mickelson

James E. Eggleston, State & Private Forestry

Larry Dietrich, DEC/DEQ

Dave Patt

Richard T. Myren

Karl Becker

Nancy Bird

Ronald A. Lee, EPA, Region 10, Environmental Evaluation Branch

Clay Schulte

A.D. Tilgner, M.D.

Stanley E. Senner, International Council For Bird Preservation

Nan Eagleston, Prince William Sound Conservation Alliance

Larry Ermold, M.D.

Kelly Davis

Chapter 6
List of Preparers

List of Preparers

Dalton Du Lac

BA, Dartmouth College, 1950;
MS Syracuse, 1960

Forest Service: 28 years

Forester, Snoqualmie NF, Skykomish RD, 4 years
Resource Asst, Snoqualmie NF, White River RD, 3.5 years
Timber Inventory Project Leader, Gifford Pinchot NF, 2 years
District Ranger, Mt. Baker NF, Monte Cristo RD, 4 years
District Ranger, Willamette NF, Detroit RD, 3.5 years
Group Leader - Dispersed Recreation & Wilderness, R-6, RO, 3 years
Group Leader - Dispersed Recreation, National Scenic Trail System, Wild and Scenic River System, WO Recreation Staff, 2 years
Forest Supervisor, Chugach NF, 6 years

Cecil R. Kuhn

BS Geology, Boise State University - 1975
Natural Resource Management Graduate School, Colorado State University

Forest Service: 13 years

Field Geologist, Willamette National Forest, 2 yrs
Engineering Geologist, So. Engineering Zone, Willamette, 6 years.
Zone Geotechnical Leader, Zone II Engineers, Gifford Pinchot NF, 4 yrs
Colorado State University, Gradute Student, 1 yr
Planning Team Leader, Chugach National Forest 6 months

Fredrick L. Patten

BS Forestry University of Montana, 1970

Forest Service: 18 years

Forester/Range Conservationist Helena & Rio Grande National Forests, 6 years
Planning Team Leader, Colville National Forest, 4 years
Forester Colville National Forest 3 years
Planning and Programing Staff, Chugach & Tongass National Forests, 5 years

Erin M. Bronk

BS University of Georgia, 1979 Forest Science
MFR University of Georgia, 1981 Quantitative Natural Resource Management

Forest Service: 9+ years

Operations Research Analyst, Chugach National Forest, 2.5 years

Operations Research Analyst, Chattahoochee-Oconee NFs, 1 year
Computer Specialist, Chattahoochee-Oconee NFs, 4 years
Forester, Chattahoochee-Oconee NFs, 2 years

Research Assistant for the Institute of Ecology and the School of Forest Resources, University of Georgia, 4 years

Robert W. Wilhelm

BS Augustana College, 1969 Business Administration
MF Utah State University, 1976 Forestry

Forest Service: 13 years

Forester, Chugach National Forest, 6 months
Interdisciplinary Planner, Chugach National Forest, 3 years
Forester, Chugach National Forest, 4 years
Forester, Tongass National Forest - Stikine Area, 3 years
Forester, Deerlodge National Forest, 2 years

Zane J. Cornett

BS Northern Arizona University, 1975 Natural Resource Management
MSF Northern Arizona University, 1978 Forestry
PhD University of Arizona, 1982 Watershed Management

Forest Service: 10 months

Computer Programmer Analyst, Chugach National Forest, 10 months

Adjunct Faculty (Forestry), University of Alaska, 6 months
Acting General Manager, native owned timber corporation, 8 months
Forester, Matanuska-Susitna Borough, 3 1/2 years

Bruce E. Williams

AA Suffolk County Community College, 1972
BS State University of New York at Stony Brook, 1974

Forest Service: 14 years

Detail in Planning/GIS, Chugach National Forest, 10 months
Hydrologic Technician, Chugach National Forest, 1 year
Hydrologic Technician, Superior National Forest, 1 year
Physical Science Technician, Region 9, 5 year
Budget Assistant, Superior National Forest, 2 1/2 years
Forestry Technician (Region 9 Fire Cache Mgr), Superior NF, 3 years
Supply Technician (Region 9 Fire Cache Mgr), Superior NF, 1 year

Biological Technician, U.S. Environmental Protection Agency, 1 1/2 years

Mark K. Franklin

BS University of New Mexico, 1978 Biology

Forest Service: 3 years

Information Specialist Interpretive Planner, Chugach NF, 1 year
Park Ranger, National Park Service, 4 years

David P. Wanderaas

BS University of Montana, 1973 (Resource Conservation)

Forest Service: 12 years

Forester, Lewis and Clark National Forest, 8 months
Forester, Chugach National Forest, 12 years

Diane Christenson

Forest Service: 2 years

Forestry Technician, PNW/Chugach National Forest, 2 years

Linda E. Kelly

BS Washington State University, 1976 Forest Management

Forest Service: 11 years

Program Analyst, Chugach National Forest
Detail in Planning/GIS, Chugach National Forest, 10 months
Forester, Chugach National Forest, 9 years
Forester, Deschutes National Forest, 4 years

Dixie L. Dies

BS Business Sociology, Minor Business Administration, Weber State College, Ogden, UT, 1983.

Forest Service: 16 years

Administrative Officer, Chugach National Forest, 1 year
Support Services Supervisor, Beaverhead National Forest, 1 year
Management Analyst, Regional Office, Region 4, 10 years
Project Clerk, Rocky Mountain Forest and Range Experiment Station, 4 years

Michael Pease

BS Forestry Washington State University, 1967
MS Fisheries Science University of Washington, 1971

Forest Service: 19 years

Forest Fisheries Biologist, Chugach National Forest, 5 years
Forest Fisheries Biologist, Tongass National Forest, 9 years
Fisheries Research Biologist, Fisheries Research Institute,

J. David Blanchet

BS Geology Williams College, 1972
Graduate Program Watershed Management Colorado State University, 1974-5

Forest Service: 14 years

Hydrologist, Chugach National Forests, 11 years
Hydrologist, Angeles National Forest, 1 year
Recreation Technician, Arapaho National Forest, 5 seasons
U.S. Geological Survey 1 year, Hydrologic Technician, Riverton Wyoming, 1 year

Samuel D. Grimes

BS in Forestry, University of Montana, March 1976
Studying for BS in Civil Engineering, University of Alaska, incomplete

Forest Service: 13 years

Transportation Planner, Chugach NF, 3 years
Assistant Transportation Planner, Tongass NF-Ketchikan Area, 2 1/2 years
Civil Engineering Technician, Tongass NF-Ketchikan Area, 6 years

Warren L. Oja

BS Forest Management, University of Minnesota, 1977

Forest Service: 7 years

Forester Watersmeet RD, Ottawa National Forest, Michigan 1 year
Sale Preparation Forester Iron River RD, Ottawa National Forest, 1 year
Regional Forest Inventory Specialist, Alaska Region, 4 years
Timber Resource Planner Supervisors Office, Chugach National Forest, 1 year

Dean F. Davidson

BA Chemistry and Math, Carthage College
MS Surfical Geology and Geochemistry, Utah State University
MS Soil Science and Hydrology, Utah State University

Forest Service: 14 years

Zone Soil Scientist Trainee, Caribou NF, 3 years
Forest Minerals and Watershed Staff, 1 year
Petroleum Geologist, Texaco, Inc. 2 years

Kim R. Barber

BS in Zoology, Weber State College, Ogden, Utah, 1971
MS in Wildlife Science, Utah State University, Logan, Utah, 1983

Forest Service: 5 years

Wildlife Biologist, Region 4, Regional Office, 2 1/2 yrs
Wildlife Biologist/Range Conservationist, Humboldt NF, 1 1/2 yrs
Wildlife/Fisheries Biologist, Chugach NF, 1 yr

Karen A. Klinge

BS in Wildlife Biology, Colorado State University, 1984

Forest Service: 5 years

Biological Technician-wildlife, Chugach National Forest. 5 years intermittent

Robert M. Muth

B.A.(History) University of Washington, 1973
M.P.A. (Natural Resources) University of Washington, 1975
Ph.D. (Natural Resource Sociology), University of Washington, 1985

Forest Service 19 years

Research Technician, Wildland Recreation Research Project, PNW Forest and Range Experiment Station, 7 years
Program Leader, Social Impact Assessment Program, National Raodless Area Review and Evaluation (RARE II), Washington, D.C., 2 years
Regional Social Scientist, Alaska Region, 10 years

Kathy M. Kurtz

BS Forest Biology, Colorado State University, 1980.

Forest Service: 9 years

Forestry Technician-Timber, Arapaho-Roosevelt NF R-2, 1 year
Forester-Recreation, Arapaho-Roosevelt NF, R-2, 2 years
Forester-Recreation Planner, Chugach NF R-10, 1 year

Robert P. Metzger

BS Biology, 1977, The Pennsylvania State University
MS Fisheries, 1980, University of Washington

Forest Service: 8 years

District Fisheries Biologist, Tongass National Forest, North Prince of Wales Ranger District, 2 years
District Fisheries Biologist, Tongass National Forest, Thorne Bay Ranger District, 2 years.
District Fisheries Biologist, Cordova Ranger District, 4 years

Michael E. Novy

BS Forestry, University of Illinois 1969
MS Wildlife Management, University of Michigan 1973

Forest Service: 16 years

Resource Forester: Tujunga RD, Angeles National Forest, 2 years
Sale Administration Forester: Tongass National Forest 2 years
Wildlife Biologist: Ketchikan Area Tongass National Forest, 3 years
District Ranger: NPOW Ranger District Tongass National Forest, 2 years
District Ranger: Thorne Bay District, Tongass National Forest, 3 years
Fish/Wildlife/Timber/Fire Program Manager: Chugach National Forest, 4 years

John R. Knorr

BS Forestry, University of Montana
MS Recreation Resources Management/Forestry Univ. of Wisconsin

Forest Service: 18 years

District Ranger, Glacier Ranger District, Chugach National Forest, 4 years
Natural Resources Interpretive Specialist, Chugach National Forest, 2 years
Supervisory Forest, Idaho Panhandle National Forest, 6 years
Public Information & Youth Conservation Corps Specialist, Tongass National Forest, 1 year
Visitor Information Specialist, Tongass National Forest, 3 years

Steve A. Okamoto

BS Civil Engineering, Arizona State University, 1975

Forest Service: 6 years

Forest Engineer, Chugach National Forest, 2 years
Supervisory Civil Engineer, Tongass National Forest, Stikine Area, 4 years

Frederick W.Prange

BS Geology and Geophysics University of Missouri at Rolla 1977
Graduate Studies Colorado State University 1988

Forest Service: 11 years experience

Geologist, Corps of Engineers 1978-1981
Forest Geologist, Ketchikan Area, Tongass National Forest 1981-1987
Management Training 1987-1988
Minerals, Soil, and Water Staff Officer Chugach National Forest 1988-1989

Duane H. Harp

BS Forestry Humboldt State College, 1971
MS Wildland Resource Management University of California, Berkeley

Forest Service: 13 years

District Ranger, Chugach National Forest, 2 years
Forester, Grand Mesa, Uncompahgre and Gunnison National Forests, 6 years
Forester, Plumas National Forest, 2 years
Forester, Tahoe National Forest, 3 years

James S. Tallerico

B.S. Landscape Architecture and Environmental Planning, Utah State University, 1974

Forest Service: 14 years

Acting District Ranger, Cordova District, Chugach National Forest, 3 months
Recreation Specialist, Chugach National Forest, 7 years
Forest Landscape Architect, Chugach National Forest, 5 years
Landscape Architect, Uinta National Forest, 2 years

Garvan P. Bucaria

BA Wildlife Conservation, San Jose State College 1958
MS Fisheries, Oregon State University 1968
MS Science Education, Oregon State University 1973

Forest Service: 11 years

Wildlife Biologist, Supervisor's Office, Chugach National Forest, 4 years
Wildlife Biologist, Cordova Ranger District, 7 years

Kenneth W. Rice

B.S.(Wildlife Management) Humboldt State University 1969
M.S.(Wildlife Management) Humboldt State University 1976

Forest Service: 11 years

Environmental Coordinator, Chugach National Forest, 2 years
Resource Assistant Anchorage RD Chugach National Forest, 5 years
Supervisory Wildlife Biologist, Chugach National Forest, 2 years
Wildlife Biologist, Tongass National Forest, 2 years

Bob Green

BS Forestry, Utah State University 1965
Associate Forestry UniversityY of Massachusetts 1961

Forest Service: 27 Years

Forester Timber Staff, Chugach National Forest 11 years
Forester Resource Management Assistant Kuiu Island, Tongass National Forest, 2 Years
Forester Timber Management Assistant, Chippewa National Forest 4 Years
Assistant District Silviculturist, Two Ranger District Niccolet National Forest, 7 years
Forester Silviculturist, Jefferson National Forest 1 year
Forestry Aid, White Moutain National Forest, 2 years

Ann G. Scott

Forest Service: 14 years
Regional Office, Juneau Alaska 3 years
Chugach NF, 10 years

Scott W. Lamoreux
BSLA Rutgers University, 1976

Forest Service: 12 years
Forest Landscape Architect, Chugach National Forest, 2 years
Forest Landscape Architect, Tahoe National Forest, 5 years
Landscape Architect, Tahoe and Dixie National Forests, 4 years
Landscape Architect, National Park Service, National Capital Region, 1 year

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We would like to acknowledge the contributions of the following:

USGS/EROS Field Office (David M. Carneggie, Mark B. Shasby, Loretta A. Wolski, Linda K. Wheeler, Michael D. Fleming, Carl J. Markon, Emily F. Binnian, and Stanton H. Moll):

The GIS database supporting this document was made possible through the generous assistance of the above personnel. For the past 2-1/2 years, EROS has provided us unlimited access to their computer system. The database was built on the Montague Island pilot project which they initiated and DEM data developed by EROS has been used in model development. They have provided invaluable systems support, graphics and database design assistance, and administrative support.

Alaska Department of Fish and Game (Kimbal A. Sundberg and Herman J. Griese),
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Chapter 7
Distribution of Document

Distribution Of Document

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Chapter 9
Glossary

GLOSSARY

AA -
See Analysis area

Activity -
Work conducted to produce, enhance, or maintain outputs or achieve administrative and environmental quality objectives.

ADF&G -
Alaska Department of Fish and Game

Affected environment -
The natural and physical environment and the relationship of people to the environment that will or may be changed by actions proposed.

Alaska Lands Act -
A shortened title for the Alaska National Interest Lands Conservation Act, enacted in 1980.

Alaska National Interest Lands Conservation Act (ANILCA) -
Passed by Congress in 1980, this legislation designated 14 national forest wilderness areas in southeast Alaska and created new national parks, refuges and monuments.

Allowable sale quantity -
The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

Alternative -
In forest planning, a mix of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis.

AMS -
Analysis of the management situation

Anadromous -
Refers to those fish--usually salmonids--that spawn (some also rear) in freshwater and spend part of their lives in saltwater.

Analysis area -
A specific area (of any size) designated for analysis in the Chugach Land Management plan.

Aquatic Habitat Management Unit (AHMU) -
The area of land adjacent to streams, lakes, or estuaries which will be managed primarily to maintain riparian values and fish habitat. They will include the wetlands, associated riparian areas, and adjacent uplands that may have a direct effect on fish habitat. (See Riparian).

Augmentation -
Total added investment furnished by the Forest Service to a sale that appraises out deficit, in the form of contribution to bring a sale up to 50 percent of the normal profit margin or supplementation, to provide for a construction standard higher than necessary for an economic and safe timber sale.

Background -
The view beginning 3-5 miles from the observer and extending as far into the distance as the eye can detect the presence of objects.

Beach Fringe Habitat -
Wildlife habitat that occurs 500 feet inland from the intertidal zone.

Biological Diversity -
The variety of life in an area, including the variety of genes, species, plant and animal communities, ecosystems, and processes through which individual organisms interact with one another and their environments.

Board Foot -
A measurement of timber volume equal to a board sawn to a dimension of 12 x 12 x 1 inch.

Carrying Capacity -
The number of animals that a habitat can maintain in a healthy, rigorous condition.

Category 2 Threatened and Endangered Species -
Plant or animal species for which available information suggests that listing a species may be appropriate but for which conclusive data on biological vulnerability are not currently available to support listing.

Clearcutting -
The removal, in a single operation, of all merchantable timber in the stand. Natural or artificial means may be used to establish regeneration. Areas clearcut may occur in blocks, patches or strips.

CLMP -
Chugach Land Management Plan. Originally published in 1984 and amended in 1986.

Cultural Resources -
Any evidence of human activities and behavior; includes data from archeology, architecture, ethnology, and history.

Demand -
The expected harvest level given no restriction on the number of hunters allowed in a season starting August 1 and ending December 31.

Developed Recreation -
Outdoor recreation requiring significant capital investment in facilities to handle a concentration of visitors on a relatively small area. Examples are ski areas, resorts and campgrounds.

Dispersed Recreation -
Outdoor recreation use occurring outside a developed recreation site; includes such activities as scenic driving, hunting, backpacking and boating.

Distance Zone -
One of three categories used in the visual management system to divide a view into near and far components. The three categories are (1) foreground, (2) middleground and (3) background. See individual entries.

Diversity of Habitat -
Implies habitats that are different rather than the same over large areas and which meet the needs of a variety of wildlife. For example, some species of wildlife require old growth forests, others thrive on fresh clearcuts or younger even-aged stands. Diversity is the proper mix of these habitats to meet the objectives set.

Eagle Nest Tree Buffer Zone -
A 330 foot radius around eagle nest trees established in a Memorandum of Understanding between the U.S. Fish and Wildlife Service and the Forest Service.

Economically Suitable -
A project, program, or activity which meets or exceeds a desirable rate of return or benefit cost ration.

Effective Acres -
A measure of winter habitat capability for deer on Montague Island. Calculated by multiplying the acres times a coefficient which evaluates the snow interception and forage production qualities of the stands with respect to its elevation and aspect for a given winter severity category.

Entry -
Harvest of a specified portion of the total rotational volume.

Endangered Species -
A plant or animal species which is in danger of extinction throughout all or a significant portion of its range.

Estuary -
For purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas, generally found at the heads of bays and mouths of streams. They are dominantly mud and grass flats and unforested except for scattered spruce or cottonwood.

Existing Visual Condition (EVC) -
A measure of how natural a landscape currently appears, expressed in terms of visual condition levels I through VI.

Foreground -
The portions of a view starting from the observer and extending up to 1/4 or 1/2 mile away.

Flood Plain -
The lowland and relatively flat areas joining inland and coastal waters, including debris cones and flood-prone areas of offshore islands, including at a minimum, areas that are subject to a 1 percent (100-year recurrence) or greater change of flooding in any given area.

Forest Arterial Road -
Serves large land areas and usually connects with public highways or other forest arterial roads. It is usually developed and operated for long-term land and resource management purposes and constant service.

Forest Collector Road -
Serves smaller land areas than a forest arterial road, and is usually connected to a forest arterial or public highway. Collects traffic from forest local roads and/or terminal facilities. May be operated for either constant or intermittent service.

Forest Development Road -
A Forest road under the jurisdiction of the Forest Service.

Forest Land -
Land at least ten percent occupied by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest Local Road -
Connects terminal facilities with Forest collector or Forest arterial roads, or public highways. Forest local roads may be developed and operated for either long or short-term service and constant or intermittent service.

Future Visual Condition (FVC) -
A measure of how natural or altered a landscape would look in the future. FVC terminology is generally used to explain the effects upon a landscape that would result from implementation of a management activity or combination of activities. Visual condition levels I through VI are used to define the FVC.

Guideline -
Any issuance which assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

Habitat Capability -
Synonymous with Carrying Capacity. The maximum number of individuals that the habitat can support.

IDT - Interdisciplinary Team -
A group of individuals representing different areas of knowledge and skills focusing on the same task, problem or subject.

Inoperable Timber -
Timber which is not practical to harvest because of potential resource damages, economic infeasibility, physical limitations or inaccessibility.

Irretrievable Commitment -
The production or use of renewable resources that is lost because of allocation decisions. It represents opportunities foregone for the period of time that the resource cannot be used.

Irreversible Commitment -
Commitment of resources that are renewable only over a long period of time, such as soil productivity, or nonrenewable resources, such as cultural resources or minerals.

Key Habitat Areas -
Areas that are productive because of high quality spawning and/or rearing areas for fish, or because of high browse density and protection for animals such as deer.

Layout -
Generally refers to the paper and aerial photographical planning and mapping of harvest and road systems needed to totally harvest a given geographical area.

Logging Debris -
Usually woody debris of various sizes that is generated through timber harvest practices. To fish habitat debris can be either harmful or beneficial.

Log Transfer Facility (LTF)-
A facility located where the road network terminates. May be used for a number of transportation purposes. For timber harvesting, the terminal transportation facility is

where logs are bundled and placed into rafts on the water for towing to local mills. The transfer facility is also called a log transfer facility when the facility is used only for logging.

Management Area Analysis (MAA)-
The process used for the evaluation of proposed project alternatives for a given management area in order to determine their feasibility and environmental effects. The analysis will follow the NEPA process, provide opportunity for public comment, and conform to Regional and National Forest Service direction.

Management Indicator Species -
A group of species selected as indicators of the effects of management practices. Included are threatened and endangered species, species commonly hunted, fished, or trapped; and species with special habitat needs that may be significantly affected by management activities.

Management Concern -
An issue or problem requiring resolution, or a condition constraining management practices identified by Forest Service management and/or staff.

Management Emphasis Prescriptions -
Specifically sets forth policies and standards under which management objectives will be carried out. Commonly consists of a comprehensive statement in words, maps, illustrations and other media explaining the means by which objectives can be carried out in pertinent management areas.

Mass Failures or Mass Movement -
The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture, and does not include individual soil particles displaced as surface erosion.

Mass Movement -
Any down slope movement of soil, rock, or earth; includes slumps, soil creep, etc.

MBF and MMBF -
Respectively, thousand board feet and million board feet.

Middlegound (middle distance) -
The space between the foreground and the background in a landscape. The area located from 1/4-1/2 to 3-5 miles from the viewer.

Middle Market -
The value and product mix that most closely matches half the absolute difference between the "high market" and the quarter with the lowest appraisal values for end product selling price during the past 10 years. Value and product mix are measured by the R-10 Index Operation and adjusted to current dollars for use.

Mining -
Includes all operations for the extraction of mineral resources--underground and open pit mines.

Mitigation -
Action or actions taken to avoid or minimize negative impacts of a management activity. Includes avoiding an impact altogether by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by limiting by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Monitoring -
Following a course of events to determine what changes occur as the result of an action.

Multi-Entry Layout (MEL) -
An integrated multi-resource process for examining timber harvest feasibility, operability and suitability.

NEPA -
National Environmental Policy Act of 1969.

NFMA -
National Forest Management Act of 1976.

NMFS -
National Marine Fisheries Service.

Non-Forest Lands -
Lands that never have had or that are incapable of having 10 percent or more of the area occupied by trees; or lands previously having such cover and currently developed for nonforest use.

Output -
The goods, end products, or services that are purchased, consumed, or utilized directly by people. Goods, services, products, and concerns produced by activities which are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. A broad term for describing any result, product, or service that process or activity actually produces.

Precommercial Thinning -
A type of tree thinning that particularly favors the dominant or selected dominants more or less evenly distributed over the stand by removing a varying proportion of the other trees.

Prescriptive Plan -
A detailed plan mode for a land management action such as a timber sale. Includes imposed restrictions for streamside strips, location of roads, etc.

Present Net Value (PNV) -
The current value of all discounted incomes minus discounted costs.

PFL - Productive Forest Land -
Forest land that is producing or is capable of producing crops of industrial wood and (a) had not been withdrawn by Congress, the secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting. Public Issue - A subject or question of widespread public interest relating to Forest Service management identified through public participation.

RPA -
Forest and Rangeland Renewable Resources Planning Act of 1964. Calls for a periodic assessment of the renewable resources of the nation.

Recreation Opportunity -
The availability of a real choice for recreationists to participate in a preferred activity within a preferred setting.

Recreation Opportunity Spectrum (ROS) -
The framework for planning and managing the recreation resource, within which, lands are identified for their ability to provide recreation experiences in one of the six classes along a continum from primitive to modern-urban. Each class is defined in terms of the degree to which it satisfies certain recreation needs based on area size, the extent to which the natural environment has been modified, the type of facilities developed, and the degree of outdoor skills needed to enjoy the area. The six classes are: (1) primitive - representing the most remote, undeveloped and inaccessible opportunities; (2) Semi-primitive non-motorized; (3) semi primitive, motorized; (4) roaded natural; (5) rural, and (6) modern-urban - representing the most developed, accessible and convenience-oriented experience available.

1.Primitive ROS Class -
Generally includes those areas out of sight and sound of human activities and greater than three miles from roads open to public travel. The areas are larger than 5,000 acres in size with opportunities for a high degree of interaction with the natural environ-

ment, challenge, risk and the use of outdoor skills. Because of their remoteness, users of these areas are normally required to stay overnight.

2.Semi-Primitive Nonmotorized ROs Class -
Generally includes those areas greater than 1/2 mile and less than three miles from roads and trails open to motorized use. The areas are generally larger than 2,500 acres in size with limited opportunities for isolation from the sights and sounds of humans and a high degree of interaction with the natural environment. Moderate challenge, risk, and the opportunity to use outdoor skills are factors in this environment.

3.Semi-Primitive motorized ROS Class -
Includes areas less than 1/2 mile from primitive roads and trails open to motorized use. Areas are generally larger than 2,500 acres in size and characterized by a predominately unmodified natural environment with minimum evidence of sights and sounds of humans. Concentration of users is normally low. Road access is not maintained in these areas.

4.Roaded Natural ROS Class -
Include areas less than 1/2 mile from roads open to public travel, railroads, major power lines and within resource modification areas. Areas in this class generally vary in size from 100 to 2,000 acres and are characterized by predominately natural environments, with moderate evidence of sights and sounds of humans. Concentration of users is moderate to low.

5.Rural ROS Class -
Includes those areas within small communities, developed ski areas and administrative sites. The areas are generally smaller than 500 acres in size and are characterized by substantially modified natural environments. Modifications are primarily to enhance specific recreation activities. Sights and sounds of humans are readily evident. Concentration of users is moderate to high.

6.Modern-Urban ROS Class -
Areas of varying sizes characterized by substantially urbanized environment. The background may have elements of a natural environment. Renewable resource modification and utilization practices are common. Vegetative cover is often exotic and manicured. Sights and sounds of humans predominant. Large numbers of visitors can be expected both on-sight and in nearby areas.

Regulated Harvest-
The regulated harvest includes any volume included in calculations of the allowable sale quantity which is harvested from suitable commercial forest land. Regulated harvests are therefore those calculated to systematize the production of forest products under principles of sustained yield on an annual or periodic basis.

Resident Fish -
Fish that are not anadromous and that reside in fresh water on a permanent basis. Resident fish include nonandromus Dolly Varden char and Cutthroat Trout.

Riparian -
The areas adjacent to streams, lakes, estuaries or wetlands which contain distinctive resource values and vegetation communities that require free or bound water or which directly influence aquatic habitat.

Riparian Ecosystems -
Includes wetlands, streams and lakes, and those areas around streams and lakes which can influence the aquatic environment.

Rotation -
The planned number of years between the formation of regeneration of a stand and its final cutting at a specific stage of maturity.

Salvage Cutting -
Cutting primarily to utilize dead and down material and scattered hazard trees that will not be marketable if left in the stand until the next scheduled harvest.

Sedimentation -
Addition of fine organic or inorganic material to a stream channel. Usually that portion remaining in the streambed gravel.

Sensitivity Levels -
A measure of people's concern for scenic quality of the national forests as seen from roads, trails, waterway or other travel routes and from facilities or other areas of the national forest that have significant public use. Level 1 has highest sensitivity and 3, lowest.

Sivilcultural Systems -
A silvicultural or management system is the entire process by which forests are tended, harvested, and replaced. It includes all cultural practices performed during the whole life of the stand, such as regeneration cutting, thinning, and improvement cutting. There are only two forest management systems available, even-aged and uneven-aged and each results in the production of a forest of distinctive form.

Silviculture -
Generally, the science and art of cultivating (i.e. growing and tending) forest crops. More particularly, it is the theory and practice of controlling the establishment, composition, constitution and growth of forests.

Site Index -
The height to which a tree will grow under forest conditions in 100 years for most mature tree species in the western United States.

Soil Hazard Areas -
Mapped areas within which various soil hazards may be encountered. Hazards include mass failures and high sediment production during road construction.

Stand -
A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity.

Standard Logging Systems -
Referred to as normal logging systems in the Timber and Silviculture Resource Report. These are systems commonly used today including highlead, A-frame, single span skyline (skyline with a reach less the 2600 feet) and tractor.

Stream Habitat Zone (SHZ) -
A mapping unit based on channel type and landform information which displays the area where there is a high probability of anadromous fish habitat.

Stream Priority -
Streams in the management area were categorized based on historical salmon escapements, the sportfishing potential of the system, the presence or absence of large fish enhancement projects and the stream's status as an AFG&G index stream. Priority One - Very high importance. Priority Two - High importance. Priority Three - Moderate to low importance.

Subunit - Game Management Unit 6 -
Subunits, as used in this document, are analogous to the hunt area subdivisions of the larger Game Management unit 6 used by Alaska Department of Fish and Game in summarizing information from the 1987 deer hunter harvest survey. Subunits 35, 36 and 37 encompass the entire area proposed for National Forest and private timber harvest and roading activities on south Montague Island. Subunits are used in this document in the discussion of the alternatives, the affected environment and the effects of the implementation of the various alternatives for wildlife. (See Uniform Coding Units).

Suitability -
The appropriateness of applying certain resource management practices to a particular unit of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

Suitable Forest Land -
Land to be managed for timber production on a regulated basis.

Temporary Road -
A short-lived road not intended to be part of the forest development road system and not necessary for future resource management.

Temperature Sensitive Streams -
Those streams flowing out of lakes or muskegs, or for some other reason susceptible to warming beyond an acceptable level determined by the interdisciplinary process.

Tentatively Suitable Forest Land -
Forest land that is producing or is capable of producing crops of industrial wood and (a) had not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting; (d) adequate information is available to project responses to timber management activities.

Threatened Species -
Any species of animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a portion of its range.

Transportation Corridor -
A delineated geographic area through which roads, waters, and air routes pass.

Unproductive Forest Lands -
Land with more than 10 percent cover of commercial tree species but not qualifying as Productive Forest Land.

Unregulated -
Areas considered impractical for timber harvest and not considered when calculating commercial land forest area. These areas include slopes over 75% and V-shaped stream channel (generally on steep-mountainous landscapes). V-notch drainages may be shallow to many feet deep and may be eroded into rock, till or other types of substrate.

Unsuitable Forest Land -
Forest land not managed for timber production because: (a) Congress, the Secretary, or Chief has withdrawn it; (b) it is not producing or capable or producing crops of industrial wood; (c) technology is not available to prevent irreversible damage to soils productivity, or watershed conditions; (d) there is no reasonable assurance based on existing technology and knowledge, that it is possible to restock lands within 5 years after final harvest, as reflected in current research and experience; (e) there is, at present, a lack of adequate information about responses to management activities; or (f) timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple-use objectives specified in the forest plan.

USF&WS -
U.S. Fish and Wildlife Service

Variety Class -
A classification system with three visual landscape categories that identify the natural scenic quality of the landscape based upon its degree of variety or diversity.

Viable Population -
A wildlife or fish population of sufficient size, demography and dispersion to maintain its existence over time in spite of normal fluctuations in population levels.

Viewshed -
The landscape seen or potentially seen from a travel route, use area, or water body.

Visual Condition level -
A measure of the degree of human-caused alteration of a landscape from its natural condition.

Visual Quality Index (VQI) -
A numerical rating of the composite scenic quality of a large area. It reflects both the inherent natural scenic value and the amount of human modification of the landscape. It is correlated to public preference ratings of these two characteristics, which give higher values to landscapes with more natural diversity and more natural appearance.

Visual Quality Objectives (VQO's) -
Measurable standards reflecting five different degrees of man made alteration of the natural landscape. The five objectives are (1) Preservation (2) Retention (3) Partial Retention (4) Modification (5) Maximum Modifications. "Inventory" VQO's reflect analysis involving other resources and become management alternative.

(1)Preservation -
Allows only ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited. This objective applies to specifically classified areas including wilderness.

(2)Retention -
Provides for management activities which are not visually evident. Management activities are permitted but the results of those activities on the natural landscape must not be evident to the average viewer.

(3)Partial Retention -
Management activities may not be evident to the viewer, but must remain visually subordinate to the surrounding landscapes.

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Appendices

Appendix A

Settlement Agreement

USDA FOREST SERVICE

CHUGACH NATIONAL FOREST

201 E. 9th

Anchorage, AK 99501

DECISION NOTICE

and

FINDING OF NO SIGNIFICANT IMPACT

for

IMPLEMENTATION OF AN AGREEMENT TO SETTLE THE APPEAL OF THE CHUGACH NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

An Environmental Analysis has been completed on the effects of implementing a negotiated agreement with the appellants of the 1984 Forest Plan, closing that appeal. The analysis is documented with an Environmental Assessment (EA) describing four alternatives, including fully implementing the agreement (the preferred alternative).

Under the preferred alternative the Forest Service and the Sierra Club and 17 other appellants agree to amend the Chugach National Forest Land and Resource Management Plan. Summarized, the amendment would entail four broad actions as follows:

First, the Forest Service agrees to adopt interim management measures to increase assurance that the current character of specific portions of the Forest is maintained. Second, the Forest will undertake a series of NEPA-based analyses on the nine Management Areas during the next 7 years to supplement existing data and to amend the Forest Plan. Thirdly, the Forest agrees to lower the timber offerings from the Plan level of 16.9 million board feet (mmbf) annually to a level not to exceed 6.3 mmbf for the first five years and 10.6 mmbf for the second five years in order to provide time to further assess the timber market situation in Southeast Alaska. Fourthly, the appellants agree to participate in the accomplishment of the above steps and not to initiate or pursue any further direct appeal or judicial review of the Chugach Forest Plan. The agreement does not affect any prior existing rights and contains wording to that effect. The agreement contains other specific provisions which are described in the agreement itself, which is attached.

It is my decision, based on the analysis and evaluation of the agreement and alternatives to it, to implement the proposed action (preferred alternative).

Environmental impacts of the preferred alternative would not exceed those already documented in the Forest Plan Final EIS. The agreement is consistent with the management plans of other Federal, State and local agencies including Coastal Zone Management plans. As a result of an ANILCA 810 evaluation, its is my conclusion that the proposed action would not significantly restrict subsistence uses.

This is not a major Federal action that would significantly affect the quality of the human environment; therefore, an environmental impact statement will not be prepared. This determination was made considering the following factors; a) no known threatened or endangered plants or animals are within the affected area; b) there are no apparent signficant adverse cumulative or secondary effects; and c) no wetlands or floodplains or cultural resources will be affected by the proposed action.

Implementation of the agreement is an amendment to the Forest Land and Resource Management Plan. It is not a significant amendment due to the minor degree of the proposed changes compared with the actual level of programs and overall management direction in the Plan. Changes in management direction for specific areas of the Forest are of an interim nature. Further analysis prescribed by the agreement is not itself a change in management direction or production of goods and services from the Forest. Any changes identified as desirable as a result of such analysis will be considered at that time as a future proposed amendment to the Plan under 36 CFR 219 procedures.

In accordance with 36 CFR 219.10(f) implementation of a non-significant amendment to a Forest Plan is the responsiblily of the Forest Supervisor. The Regional Forester will also sign this Decision Notice since he was the Forest Service official signing the agreement with the appellants.

This decision is subject to administrative review in accordance with 36 CFR 211.18.

Implementation may take place 30 days subsequent to this date.

Dalton Du Lac
Forest Supervisor
Chugach National Forest
201 E. 9th Street
Anchorage, AK 99501

January 7, 1986
Date

for Michael A. Barton
Regional Forester
Alaska Region
Box 1628
Juneau, AK 99802

1/7/86
Date

APPELLANTS:

Sierra Club, Alaska Chapter; Wilderness Society; Alaska Wilderness Sailing Safaris, Inc.; National Audubon Society; Cordova District Fisheries United; Otter Enterprises; Stella Polaris Charters; Alaska Marine Charter Services; Stan Stephens Charters; Simpson's Marine Charters; Jackpot Charters; Arctic Tern II Leasing; National Outdoor Leadership School; Prism Ski Touring; Knik Kanoers and Kayakers, Inc.; North Gulf Oceanic Society; and Natural History Ventures

36 CFR 211.18
APPEAL OF REGIONAL FORESTER APPROVAL OF CHUGACH NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

INTERVENORS:

Southeast Alaska Conservation Council
Alaska Resource Development Council

CHRONOLOGY

The Sierra Club and 17 other Appellants filed, on August 17, 1984, an administrative appeal of the Regional Forester's decision to approve the Land and Resource Management Plan of the Chugach National Forest ("Chugach Forest Plan"). This Notice of Appeal was amended by the Appellants on September 10, 1984. The Appellants' Statement of Reasons for the appeal was filed on October 10, 1984. The Regional Forester of the Alaska Region filed a Responsive Statement on December 10, 1984. The Appellants then filed a reply to the Responsive Statement on December 31, 1984. Thomas R. Anthony, Richard W. Tindall, the Alaska Resource Development Council and the Southeast Alaska Conservation Council requested intervenor status in the appeal. On November 26, 1984, the Chief of the Forest Service denied the requests of Thomas R. Anthony and Richard W. Tindall for intervenor status. On December 14, 1984, the Chief of the Forest Service initially denied intervenor status to the Southeast Alaska Conservation Council. Upon review of subsequent information, the Southeast Alaska Conservation Council was granted intervenor status on February 5, 1985. The Alaska Resource Development Council was also granted intervenor status on February 5, 1985. On January 23, 1985, the Chief of the Forest Service agreed to suspend the appeals process until April 10, 1985, to allow time for negotiations on the issues presented in the appeal. Further suspensions have been authorized by the Chief to allow negotiations to proceed.

In order to resolve the issues raised in the appeal without the necessity for further proceedings, the Regional Forester and all Appellants agree to the following:

AGREEMENT

I. Forest Service Actions:

A. The Regional Forester agrees to cause amendment of the Forest Plan as necessary to incorporate the following interim management measures:

1. As indicated in the Forest Plan and July 27, 1984, Record of Decision, until completion of Congressional action on the Wilderness Study Area, the Nellie Juan and College Fiord Management Areas will be managed to be consistent with the wilderness management guidelines in ANILCA. Should Congress enact legislation on the Wilderness Study Area designation question prior to revision of the Forest Plan, any portion of the Study Area not designated as Wilderness will be managed consistent with maintaining Recreation Opportunity Spectrum (ROS) class Semi-Primitive Non-Motorized conditions (see Appendix A - ROS Setting Characteristics and ROS Experience Opportunities), subject to valid existing rights, until the Forest Plan is revised.

2. Hinchinbrook Island (Management Area #8), Russian River/Resurrection River (Management Area #4) and Eastern Copper River/Martin River (Management Area #9) (See boundary maps enclosed as Appendix B):

a. Subject to valid existing rights, these areas will be managed consistent with maintaining Primitive II ROS class conditions until the Plan is revised (see Appendix A - ROS Setting Characteristics and ROS Experience Opportunities).

b. The Forest Service will not schedule timber harvesting or related timber road construction in these areas prior to the revision of the Plan. Other resource management activities consistent with the Primitive II ROS classification may be initiated prior to the revision of the Plan.

c. Subject to valid existing rights, the Forest Service will require the effects of activities undertaken by others on National Forest System lands to be mitigated to the extent practicable to be consistent with maintaining Primitive II ROS class conditions.

3. Copper River (Management Area #9). In addition to the management direction contained in the Chugach Forest Plan, the July 27, 1984, Record of Decision, and section I.A.2. of this Agreement:

a. Subject to valid existing rights, the Forest Service will not schedule any timber harvest, timber road or other Forest Service road construction, nor will the Forest Service recommend surface occupancy for mineral leasing outside the Copper River road corridor, prior to publication of final regulations pursuant to ANILCA 501(b) or prior to completion of Management Area Analysis for the Copper River Management Area, whichever is earlier.

b. Timber harvest, related timber road construction, other Forest Service road construction and recommendations for surface occupancy for mineral leasing within the Copper River road corridor may be undertaken to the extent and in a manner consistent with the conservation of fish and wildlife and their habitat.

c. Recreation development, fish and wildlife enhancement projects, research projects and similar management activities may be undertaken within or outside the road corridor, to the extent and in a manner consistent with the conservation of fish and wildlife and their habitat.

d. The management direction in paragraphs a, b and c above may be modified or superceded by the provisions of final regulations implementing Section 501(b) of ANILCA.

e. Subject to valid existing rights, prior to the revision of the Forest Plan the Forest Service will not schedule any timber harvest or timber-related road construction within the Lower Bering River area between the Primitive II area shown in Appendix B-3 and the 173,000-acre area east of the Bering River discussed on page 5 of the Record of Decision for the Final Environmental Impact Statement for the Chugach National Forest Land and Resource Management Plan.

4. a. The level of timber sale offering will not exceed an annual average of 6.3 million board feet for the first five years and 10.6 million board feet for the second five years of the Ten-Year Timber Action Schedule attached as Appendix C. This will allow time to further assess the viability of a renewed timber industry in southcentral Alaska; to further monitor and evaluate the market projections incorporated in the Forest Plan; and to complete Management Area Analysis for Management Areas where Forest Service timber harvesting and timber management related road construction activities are scheduled to occur.

b. The Ten-Year Timber Sale Action Schedule may be modified pursuant to the implementation and amendment provisions of 36 CFR 219.10(e) and (f) (1982), without violating the terms of this agreement, as long as:

i. the modification does not result in levels of timber sale offerings exceeding the applicable annual average of Section I.A.4.a. of this Agreement, and

ii. the modification does not result in scheduling of timber harvest activities in areas excluded from scheduling of timber harvest by the terms of this Agreement, the Forest Plan, or the July 27, 1984, Record of Decision.

5. Applicable Alaska Regional Guide standards and guidelines will be expressly incorporated by reference in the Plan.

6. Public disclosure of the timber sale schedule and direction described above will be made within 30 days of the finalization of this settlement, and implemented as an amendment to the Forest Plan pursuant to 36 CFR 219.10(f) (1982).

7. Modification of this management direction may be considered and implemented prior to the revision of the Plan, but only in accordance with 36 CFR 219.10(e), (f), or (g) (1982), or succeeding regulations and only as consistent with items I.A.1. through I.A.4. above.

8. The Forest Service may take such measures as may be necessary to control fire, insects, or diseases, without violating the terms of this agreement.

B. The Regional Forester agrees that the Forest Service will complete Management Area Analyses according to the schedule enclosed as Appendix D, subject to the limits of available funding and personnel. Management Area analyses will be prepared following NEPA procedures, will be tiered to the Forest Plan EIS, will be consistent with the terms of this Agreement, and may result in an amendment or revision of the Forest Plan pursuant to 36 CFR 219(e), (f) or (g) (1982), or succeeding regulations. Management Area analyses will be circulated for public comment and will provide sufficient information and analysis to reasonably address the topics described below on a Management Area-wide basis.

1. Minerals Area Management - a. Current and projected mineral exploration and development in the management area will be considered in developing surface resource management direction tiered to forest plan direction, based on available government and other nonproprietal information.

b. To the extent practicable, the following will be identified in reasonable detail:

1. Current and projected future location and level of development of active mining claims, patented or unpatented.

2. Location of probable occurrences of substantial deposits of locatable, leasable, and common variety minerals.

3. Current and projected future access needs for exploration and development of active mining claims and areas of probable mineral occurrence.

4. Potential environmental effects of current and projected future exploration and development.

c. To the extent practicable, alternative measures to prevent or mitigate environmental impacts will be considered, including the potential need for withdrawal of areas from mineral entry or development, consistent with the requirements of 36 CFR 219.22(d) (1982) or succeeding regulations and NEPA.

d. In selecting mitigating measures for incorporation into management prescriptions or other direction, the probable effect of such measures on mineral resources and exploration and development activity will be considered.

2. Recreation - Current recreation use and other pertinent data from the Forest Service Recreation Information Management System (RIM) and other sources will be incorporated into the analysis.

3. Timber - a. Current inventory data will be incorporated. Preliminary detail on actual timber sale area locations will be provided. Particular and final timber sale layout, however, will be addressed in individual timber sale NEPA documents tiered to the MAA and Plan.

b. Prior to completion of MAA, timber harvesting and other resource development activities within the road corridors on the Kenai Peninsula and on the Copper River Delta will be implemented utilizing appropriate NEPA project analysis.

4. Subsistence - An analysis of the effects of proposed management actions on subsistence will be made according to the requirements of ANILCA Section 810.

5. Transportation Planning - Reasonable alternative transportation systems (e.g., roads, trails, log transfer facilities) will be addressed, including effects on resources. Specific transportation facility locations attributable to individual projects will be addressed in individual project NEPA documents tiered to MAA and the Plan.

6. Land Selections - The effects of Chugach Alaska Corporation (CAC), formerly Chugach Natives Incorporated (CNI), and other land selections on the Management Area will be addressed.

7. Standards and Guidelines - Standards and guidelines applicable to the Management Area, including those related to management of riparian areas and soil hazard areas, will be reassessed and updated, if necessary.

8. Environmental Impacts - Effects of proposed management actions on the environment, including wilderness characteristics of roadless areas, will be analyzed in accordance with NEPA.

II. Appellant Actions:

A. Each Appellant agrees to participate to the extent practicable in all steps described in Section I above, provided that the Forest Service provides the Appellant actual notice at the stage where participation is appropriate.

B. Each Appellant agrees not to initiate or pursue any further direct appeal or judicial review of the Chugach Forest Plan, EIS or Record of Decision. Each Appellant agrees that in the event any Appellant or member, representative, or successor thereof initiates or pursues further direct appeal or judicial review of the Chugach Forest Plan, EIS or Record of Decision, any Forest Service agreement or obligation herein is discharged and void.

C. Each Appellant reserves any rights to initiate and pursue appeals or judicial review of any future Forest Service actions, including future NEPA documents relating to actions on the Forest, on the basis of any issues other than specific claims raised in their August 17, 1984, appeal of the Chugach Forest Plan, EIS, and Record of Decision. Each Appellant agrees that initiation or pursuit, by any Appellant or member, representative, or successor thereof, of any further appeal or litigation realleging any claims raised in the August 17, 1984, appeal of the Chugach Forest Plan, EIS, and Record of Decision voids any Forest Service agreement or obligation herein affected by the appeal or litigation.

D. Each Appellant agrees that the interim management direction and amendment of the Chugach Plan described in I.A. above do not constitute an amendment of the Chugach Plan that would result in a significant change in the Plan for purposes of 36 CFR 219 or the National Forest Management Act, and do not require the preparation of an environmental assessment or additional Environmental Impact Statement for purposes of the National Environmental Policy Act or other applicable law or regulation.

III. OTHER PROVISIONS

A. Purpose, Effect, and Use of Agreement: Appellants and the Regional Forester concur that this Agreement binds them only as provided herein. This Agreement is entered into for the purposes of settling the issues raised in this appeal with respect to the Chugach National Forest only, and for no other purpose. This Agreement shall not be cited or otherwise relied on in any appeal or legal proceedings, whether judicial or administrative in nature, in which any Appellant or the Forest Service or their respective counsel have, or may acquire, an interest, except as is necessary to effect the terms of this Agreement. Provided; this Agreement shall be made part of the record in the current appeal. This Agreement shall not be evidence of any agreement by the Forest Service with any allegations raised by any Appellant or Intervenor in this appeal, nor evidence of any agreement by any Appellant to any allegation raised by the Forest Service or any Intervenor in this appeal.

B. Intervenors and Third Parties: Any intervenor or third party having an interest in this proceeding may elect to join this Agreement. Signature of this Agreement by any Intervenor or other third party, or authorized representative thereof, shall bind the Intervenor or third party as if the Intervenor or third party were an Appellant. Provided, this agreement shall continue in full force and effect between the Forest Service and Appellants, notwithstanding any action by a signing Intervenor or third party, subject to III.C. below.

C. Severability/Termination Due to Frustration of Purpose: Appellants and the Regional Forester agree that if any part of this Agreement shall be determined unlawful by a court of competent jurisdiction, all other lawful terms shall remain in full force, unless the entire purpose of this Agreement is frustrated thereby. Appellants and the Regional Forester agree that if a ruling by a court of competent jurisdiction or a final decision by the Chief of the Forest Service or senior official of the Department of Agriculture in the event of a continuation of the present appeal, requires the Forest Service to withdraw or undertake significant amendment or revision of the Chugach Plan, the entire purpose of this Agreement is frustrated thereby. In such event, the Agreement shall terminate upon such withdrawal or initiation of such amendment or revision process.

D. Other Termination: This Agreement shall otherwise terminate upon implementation of any revision of the Chugach Land and Resource Management Plan pursuant to 36 CFR 219.10(f) or (g) (1982) or succeeding regulations.

E. Valid Existing Rights/CNI Agreement: This Agreement is subject to any valid existing rights of entities who are not parties to this Agreement. Nothing in this Agreement will be construed to modify any terms or conditions of the 1982 CNI Settlement Agreement, including any transportation corridors through areas to be managed consistent with ROS Primitive II conditions.

F. Attorney Fees/Costs: All questions pertaining to Appellants' entitlement to costs and attorney's fees and the amounts thereof are specifically reserved for subsequent resolution either by the parties or by a court of competent jurisdiction. The Forest Service and all Appellants do not admit to any liability for any such fees or costs alleged by any other party.

APPELLANTS:

Sierra Club, Alaska Chapter; Wilderness Society; Alaska Wilderness Sailing Safaris, Inc.; National Audubon Society; Cordova District Fisheries United; Otter Enterprises; Stella Polaris Charters; Alaska Marine Charter Services; Stan Stephens Charters; Simpson's Marine Charters; Jackpot Charters; Arctic Tern II Leasing; National Outdoor Leadership School; Prism Ski Touring; Knik Kanoers and Kayakers, Inc.; North Gulf Oceanic Society; and Natural History Ventures

By Lauri J. Adams
Lauri J. Adams
Sierra Club Legal Defense Fund, Inc.
Attorney for Appellants

By /s/
Peter Kirby
Wilderness Society
Attorney for Appellant Wilderness Society

Date November 22, 1985

INTERVENORS:

Southeast Alaska Conservation Council

By _____

Date _____

Alaska Resource Development Council

By _____

Date _____

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE
Regional Forester, R-10

By Michael A. Barton
Michael A. Barton,
Regional Forester

Date 11/26/85

APPENDIX C

CHUGACH NATION FOREST
TEN-YEAR TIMBER ACTION SCHEDULE

FISCAL YEAR	MGT AREA/ DISTRICT	SALE NAME	LOCATION	ESTIMATED VOL. (MMBF)
1985	1/03	Johns Creek	Mile 40	1.3
	1/03	East Side #2	Mile 41	.4
	1/03	Misc. Sm. Sales	District Wide	.1
	1/03	Old Sterling	Tern Lake	.3
				2.1
1986	1/03	Guard Stat. #2	Hope Rd.	.5
	1/03	Misc. Sm. Sales	District Wide	.9
	1/03	Snug Harbor #2	Snug Harbor Rd.	.6
				2.0
1987	1/03	Canyon Creek	Mile 44	.5
	1/03	Bay Creek	Hope Rd.	.2
	1/03	Sunrise	Mi. 45 Sterling	.5
	1/03	Summit Salvage	Lower Summit Lk.	.4
	1/03	Misc. Sm. Sales	District Wide	.7
				2.3
1988	9/02	Saddlebag HL/FW	Mile 25	.5
	1/03	Boston Bar	Hope Rd.	.5
	1/03	Granite Cr. No.A/B	Granite Cr.	.5
	1/03	Sunset Cr.	Hope Rd.	.5
	1/03	Blackstone Canyon	Res. R. Rd.	.4
	1/03	Misc. Sm. Sales	District Wide	.4
				2.8
1989	7/02	St. Matthews & Olson Bays		20.0
	1/03	Misc. Sm. Sales	District Wide	.7
	1/03	Russian River		1.5
				22.2
First Five Years = 6.28 MMBF/Year Annual Average				
1990	3/03	Juneau Cr. East	Juneau Creek	.5
	1/03	Palmer Creek #3	Palmer Creek	.5
	1/03	Misc. Sm. Sales	District Wide	1.0
				2.0
1991	1/03	Snow River		5.0
	1/03	Misc. Sm. Sales	District Wide	.5
				5.5

CHUGACH NATION FOREST
TEN-YEAR TIMBER ACTION SCHEDULE

FISCAL YEAR	MGT AREA/ DISTRICT	SALE NAME	LOCATION	ESTIMATED VOL. (MMBF)
1992	8/02	Big Island	Montague	36.0
	1/03	Misc. Sm. Sales	District Wide	2.0
				38.0
1993	9/02	McKinley	Cordova Road	2.0
	1/03	Gunshop	Mile 16	1.5
	1/03	6 Mile	6 Mile Creek	2.0
				5.5
1994	3/03	Juneau Ck West	Juneau Creek	1.5
	1/03	Misc. Sm. Sales	District Wide	.5
				2.0

Second Five Year = 10.6 MMBF/Year Annual Average

Districts 01=Anchorage 02=Cordova 03=Seward

APPENDIX D

SCHEDULE FOR MANAGEMENT AREA ANALYSIS

No.	Management Area Title	District (No.)	Proposed Completion
1	Road Corridor, Kenai Peninsula	Anchorage/Seward (01/03)	1988
2	East Side, Kenai Peninsula	Anchorage/Seward (01/03)	1989
3	Resurrection, Kenai Peninsula	Seward (03)	1988
4	Crescent Lake, Kenai Peninsula	Seward (03)	1991
5	Nellie Juan, Prince William Sound	Anchorage (01)	1992
6	College Fiord, Prince William Sound	Anchorage (01)	1992
7	Gravina, Prince William Sound	Cordova (02)	1987
8	Big Islands, Prince William Sound	Cordova (02)	1990
9	Copper River	Cordova (02)	1989

Appendix B

Outfitter and Guide Social Carrying Capacity Process

Appendix B

Rationale for Estimates of Outfitter-Guide Capacity

The approach used in this analysis for estimating social carrying capacity is based on the process delineated in the 1986 ROS Book. The process was modified using the most recently available literature on determination of carrying capacity and especially outfitter/guide allocation where available. The end result, estimated carrying capacity in terms of number of campsites, resulted from issues pertinent to this Management Area. Social carrying capacity may be calculated for day use (number of persons at one time PAOT per area), number persons/mile trail, number of parties encountered per day, or number of campsites per area). This analysis used campsites as the basis for the O/G use level determination because that best met the information needs of the district.

Issues surfaced in early 1987 as a result of O/G requests for overnight campsites in eastern Prince William Sound. In addition, some questions during scoping for BI centered on where, how many and when O/G permits would be allowed. A February 2, 1987 Environmental Assessment for Tent platforms on Eastern Prince William Sound stated in part "A larger scale analysis which evaluates all protected bays and anchorages will be deferred until Management Area Analysis (MAA)."

Those questions are best answered by estimating the number of overnight sites for outfitter use for each area or protected bay. The rationale for this statement is that a basic recreation management objective is to maintain the desired recreation opportunity for a given area. The qualities that comprise the desired recreation setting and/or opportunity are described in the Recreation Opportunity Spectrum (ROS) 1/ for that area. The MAA process validates the inventoried ROS class (or proposes changing it).

An integral element of the ROS is the social carrying capacity and issuing new O/G permits has the potential to affect this. The applicable premise for the BI area is that each area or bay can only hold so many parties at one time and still maintain the desired recreation experience. That number is dependent on the ROS objective and other factors outlined below. (The number of person per party varies by ROS class and that number is indicated in the MAA wide standards and guidelines ROS charts). Therefore an analysis was undertaken to determine the maximum number of sites (or parties at one time) for each area or protected bay. During that analysis, the following factors were also considered:

1. existing and potential recreation facilities
2. existing Outfitting and Guiding permits
3. availability of O/G opportunities such as hunting and fishing
4. current public use levels
5. physical characteristics such as usable area, amount and type of vegetation for screening, and fragility of the natural environment

1/ ROS is comprised of three elements: 1) activities, 2) setting and 3) experiences.

Appendix C

MIS Monitoring Plan

MONITORING PLAN FOR MANAGEMENT INDICATOR SPECIES

The Forest Service has selected 10 Management Indicator Species (MIS) to represent the wildlife and fish species of the Big Island Management Area. Monitoring the status of these species and/or their habitats provides an estimate of the effects of management actions on the groups of animals they represent (Sidle and Suring 1986). Monitoring will emphasize Sitka black-tailed deer, bald eagles, pink salmon, and coho salmon due to management concerns and public issues identified during the planning process. Several of the MIS have low population densities on Montague Island which make direct population monitoring impractical. Therefore, monitoring efforts will focus on compliance with the standards and guidelines, and on important habitat characteristcs. Monitoring intensity will be greatest on the south portion of Montague Island due to the proposed management activities in that area.

The following table shows the level and type of monitoring to be implemented by the Forest Service. Monitoring techniques and frequency will be reassessed and validated by the results of the initial monitoring efforts. Monitoring will be modified as new inventories and techniques become available.

MANAGEMENT INDICATOR SPECIES	GENERAL HABITAT TYPE	FOCUS OF MONITORING	MONITORING FREQUENCY	RELIABILITY OF SAMPLING
SITKA BLACK-TAILED DEER	Mature Forest	Winter range habitat Hunting	Annually	High
BALD EAGLE	Mature Forest Coastal snags	Nest & Roost Habitat National Concern	2 - 3 Years	High
BROWN BEAR	Mature Forest	Bear-Human Conflicts	Annually	Moderate
MONTAGUE VOLE	Muskegs Uplifted beach	Candidate T & E species	Annually, First 5 years	Unknown
CANADA GEESE	Mature Forest Wetlands	Nest and Brood Habitat	Annually first 3 years Then 3 - 5 years	Unknown
WOODPECKERS	Snags	Nesting habitat	3 - 5 years	Moderate
COMMON MERGANSER	Riparian Snags	Nesting habitat Availability of coho fry	3 - 5 years	Moderate
PINK SALMON	Streams	Spawning Habitat	Annually	High
COHO SALMON	Streams	Rearing Habitat Sport Fishing	Annually	Moderate
CUTTHROAT TROUT	Streams Lakes	Rearing Habitat Sport Fishing	Annually	Low

MANAGEMENT INDICATOR SPECIES	MONITORING PLAN
SITKA BLACK-TAILED DEER	1) Cooperate with ADF&G on spring composition (Adult:fawn ratios) flights 2) Cooperate with ADF&G on existing pellet group transects and hunter use surveys 3) Coordinate with ADF&G to add additional pellet group transects on South Montague to reflect population response to timber harvesting. A description of the techniques can be found in the ADF&G report "Deer pellet-group surveys in Southeast Alaska; 1981 - 1987" by M.D. Kirchhoff and K.W. Pitcher.
BALD EAGLE	1) Cooperate with USFWS to conduct nesting and hatching censuses once every two-three years. Monitoring frequency may be reduced if initial results show no significant change. a) Fly coastline, or portions of the coastlines, to locate nests and determine which are active in May. b) Fly hatching success census in mid-July. 3) Monitor selected active nests within the project areas to determine hatching success. 4) Monitor compliance with standards and guidelines that protect nest trees and associated habitat.
BROWN BEAR	1) Cooperate with ADF&G on the spring den emergence survey. 2) Cooperate with ADF&G on hunter use surveys 3) Cooperate with ADF&G to develop the methodology to survey the general public on bear-human incidents. 4) Monitor any change in "defense of life and property" situations with brown bears. 5) Monitor compliance of standards and guidelines for human facilities. 6) Determine the feasibility of initiating a road scat census.
MONTAGUE VOLE	1) Monitor habitats identified through inventories. 2) Develop population trend sampling scheme if inventories indictate the need.
CANADA GEESE	1) Monitor compliance with standards and guidelines near waterfowl use areas. 2) Transect sampling to monitor changes in goose use of representative vegetation types. Monitoring frequency will be reduced to every 3 - 5 years once initial use patterns are determined.

MANAGEMENT INDICATOR SPECIES	MONITORING PLAN
WOODPECKERS	1) Monitor compliance with standard and guidelines for protecting snags. 2) Monitor continued availability of snags in harvested areas
COMMON MERGANSER	1) Monitor compliance with snag guidelines in riparian areas 2) Monitor food source and stream quality (See Coho monitoring plan).
PINK SALMON	1) Monitor development activities to verify compliance with standards and guidelines to protect riparian habitat. 2) Utilize ADF&G aerial escapement surveys to monitor population trends in index streams. 3) Conduct on-the-ground escapement surveys to monitor production at representative fish enhancement project sites. 4) Conduct preemergent fry studies at selected sites.
COHO SALMON	1) Monitor development activities to verify compliance with standards and guidelines to protect riparian habitat. 2) Conduct mark/recapture population estimates of coho fry in selected stream reaches. 3) Monitor Catch Per Unit Effort for recreational cabin users.
CUTTHROAT TROUT	1) Monitor development activities to verify compliance with standards and guidelines to protect riparian habitat. 2) Monitor Catch Per Unit Effort for recreational cabin users.

MONITORING PLAN FOR SITKA BLACK-TAILED DEER ON MONTAGUE ISLAND

Introduction:

Techniques have been developed in Southeast Alaska for monitoring population trends through pellet-group transect counts. In 1988, the Alaska Department of Fish and Game initiated a similar transect procedure on the three big islands in Prince William Sound. Spring composition flights (aerial censusing of the beach areas to determine the fawn to adult ratio) were also initiated in 1988. Hunter questionaires are requested every two to three years. These projects will provide valuable population trend information, however, additional information will be needed to provide a reliable trend pattern on south Montague Island where timber harvesting activities are planned.

Monitoring methods:

The Forest Service will cooperate with ADF&G to establish additional pellet-group transects on the south portion of Montague Island. These transects will represent habitats in close proximity to harvested areas, and habitats that are not associated with proposed actions. A detailed description of the pellet-group transect methods can be found in the ADF&G report "Deer pellet-group surveys in Southeast Alaska. 1981 - 1987" by M.D. Kirchhoff and K.W. Pitcher. This report describes the assumptions used in pellet-group transects and the advantages of various changes in sampling designs. The following paragraph describes the preferred monitoring procedure and then describes an alternative if the level of funding is not adequate.

Eight sampling areas will be located on the southern portion of Montague Island. Four of these will be on, or adjacent to, areas that will be impacted by the proposed actions, and four will be in areas that will not be effected. These eight sampling areas will be divided into two groups that will be monitored in alternating years. Two control areas and two 'impacted' areas will be monitored each year. This alternating pattern is described in the ADF&G report as eliminating some of the sampling error that occurs on annual counts. Each sampling area will have three permanent transects; six people could complete one area in one day.

Estimated cost: $4000.00 to complete four sampling areas semi-annually.

Additional studies:

In addition to cooperating with ADF&G on the pellet-group transects, the Forest Service will initiate a study to monitor the snow depth on Montague Island. This information can be used in conjunction with the pellet transect information to validate the Prince William Sound deer model and estimate winter severity. Snow depth markers will be placed in areas that can be seen from the air and can be accessed from the ground during the winter. Adjacent forested habitats will be surveyed on foot and a correlation developed with the snow depth represented by the marker in open areas.

SUMMARY:

Monitoring methods:

1) Monitor compliance with standards and guidelines as part of timber sales administration.
2) Cooperate with ADF&G spring composition census and deer hunter surveys.
3) Cooperate with ADF&G on existing pellet group transects
4) Coordinate with ADF&G to add additional transects on South Montague.
5) Initiate snow depth study.

Monitoring frequency:

All facets of the monitoring plan will be completed annually except for monitoring pellet group transects which will be conducted every second year.

Estimated cost: $4,000.00 semi-annually for pellet-group transects. $6,000.00 for hunter survey ever third to fifth year.

MONITORING PLAN FOR BALD EAGLES ON MONTAGUE ISLAND:

Introduction:

The USFWS has conducted 5 censuses to locate eagle nests on Montague Island since 1974. Both aerial census techniques and a boat census have been used although the aerial censuses are considered to be more accurate. All of the known nests have been found within a half mile of the coast. The USFWS generally fly two aerial surveys to cover an area for eagles. The first survey is done in May. All nests are located and determined to be active or inactive and all eagles are counted. A second survey of all active nests is flown in July. This survey determines which nests are still active (and therefore, successful) and hatchlings are counted if possible. The Forest Service will cooperate with the USFWS to establish regular surveys of eagles on Montague Island.

Monitoring methods:

1) Cooperate with USFWS to fly both censuses on a 2 - 3 year schedule.
2) FS personnel will determine the hatching success of selected nests near activity areas each year.
3) The Forest Service will monitor compliance with the 100 meter (330 feet) protection zone around nest trees and with other guidelines.

Monitoring frequency:

Monitoring frequency may be reduced if initial results show no significant change in the population.

Estimated cost:

$4,000.00 every 2 - 3 years in cooperation with USFWS; $1000.00 for on-site personnel to monitor hatching success near activity areas.

MONITORING PLAN FOR THE MONTAGUE ISLAND TUNDRA VOLE:

Introduction:

The Montague Island Tundra vole is believed to be a distinct subspecies of Microtus oeconomus, originally identified in 1906. Very little is known about the Montague vole, including its true distinction as a subspecies. The U.S. Fish and Wildlife Service lists the vole as a Category 2 species which indicates that there is concern for the longterm viability of the subspecies, but not enough information to list it as Threatened. In 1987 the U.S. Forest Service initiated a survey to identify habitats, and to obtain a genetics classification of the subspecies. Areas in Patton Bay, San Juan Bay and Port Chalmers were surveyed. Attempts were made to continue the survey in 1988; however, funding limited the extent of the survey. The limited results obtained indicate that the voles inhabit the 'new beach' areas and the 'dry muskegs' at low elevations. No signs of voles were observed in timbered areas. The Standards and Guidelines for the management area identify the need for a continued inventory of habitats to identify areas used by the voles.

Monitoring methods:

The baseline inventory data will be used to identify habitats and their distribution. This information will be assessed to determine the need to monitor for relative abundance. If the need for monitoring is identified, population trends for the voles will be established using nested grid live-trapping techniques. This method can be used to establish the density of the population and repeated trapping efforts will provide trend information.

Recognition of the cyclic pattern of microtine populations (2 - 5 years) will influence the duration of monitoring.

Costs: Will be determined after the inventory stage is completed and the extent of sampling is known.

MONITORING PLAN FOR BROWN BEARS ON MONTAGUE ISLAND:

Introduction:

The population density of brown bears on Montague Island has been low since the earthquake of 1964 altered the availability of salmon on the island. Obtaining actual population density information is difficult; however, ADF&G has begun a spring den emergence survey that provides a rough index of the population. This survey is flown during the peak of den emergence, the number of tracks observed around the den and the number of dens provides population trend information. ADF&G has included questions concerning bear sightings and confrontations on the deer hunter survey. ADF&G also records of the number of successful hunters and the number of bears destroyed in defense of life and property. These records supply additional information that can be used in assessing the status of the bear population in Prince William Sound.

Monitoring methods:

1) Cooperate with ADF&G on the hunter use surveys.
2) Cooperate with ADF&G on the den emergence census.
3) Cooperate with ADF&G to develop methods to document human-bear incidents with the general public.
    a) This may be as simple as requesting that cabin users record observations and incidents in a log book.
    b) A more costly and complicated approach would be a public survey.
4) Monitor any trends or changes in "Defense of life and property killings".
5) Monitor compliance with standards and guidelines with emphasis on facilities and on areas that receive seasonal high use by bears.
6) Consider a periodic (early and late summer) scat census along the road which may also supplement the den emergence census.

Estimated cost:

Minimal cost associated with this monitoring because the information is currently being gathered by ADF&G and/or will require limited time from FS personnel.

MONITORING PLAN FOR WOODPECKERS ON MONTAGUE ISLAND:

Introduction:

Woodpeckers rely on dead and dying trees for nesting cavities and for their food sources. Timber harvesting can reduce woodpecker habitat if precautions are not taken to protect the trees that they depend on. The Forest Service recognizes this dependance and has made a nation-wide effort to ensure the availability of snags to cavity nesting birds. The Forest Service has specific guidelines to ensure that snags and dying trees are left standing throughout harvested areas. Several species of woodpeckers are considered uncommon or rare in the Prince William Sound; however, the blackbacked three-toed woodpecker is a casual resident during the winter months. The low density of woodpeckers in the area make direct population monitoring impractical; however, the habitat can be monitored to ensure availability.

Monitoring methods:

1) Monitor compliance with the standards and guidelines for protecting snags and some dying trees.
2) Conduct random "spot checks" to assess the continued availability and use of snags in harvested areas. These checks will evaluate the number of snags available in harvested areas in 3 - 5 year intervals after harvesting.

Estimated cost:

$500.00 during harvesting (to support extra time that the Timber Sales Administer may spend monitoring compliance with guidelines).

Costs for the post-harvest evaluation should be minimal by combining this with other activities in the area.

MONITORING PLAN FOR CANADA GEESE ON MONTAGUE ISLAND:

Introduction:

The "Prince William Sound" Canada geese population was selected as a management indicator species to monitor the effects of management activities on wetland areas and associated mature forest. There is little available information on geese in Prince William Sound. A genetics study to determine which subspecies the geese belong to is currently underway. The results are expected during the spring of 1989. Known behavior suggests similarities to the Vancouver Canada geese population of Southeastern Alaska. Therefore, the draft habitat capability model developed for the Vancouver geese in southeast Alaska has been used for general information on habitat requirements (Doyle et. all 1988). Because of the low density and lack of specific knowledge about the Prince William Sound population, several standard techniques used for assessing goose populations are inappropriate for Montague Island; therefore, monitoring efforts will focus on standards and guidelines monitoring in important habitats.

Monitoring Methods:

1) Monitor compliance with the standards and guidelines for activities near goose and other waterfowl habitats.

2) Transects will be established in areas believed to be used by geese. Observations of geese and goose signs can be made while walking the transects. Several transects will be placed in the different vegetation types believed to be important to the geese. Transects will be repeated annually for three years to try and establish an index to population trends, and to gather baseline information on the habitat use patterns of geese on Montague Island. Intensive searches of areas which may be used for nesting will be conducted on an exploritory basis. This information as well as the first few years of transect data will be used to evaluate the efficiency of the monitoring method and techniques may be refined to provide more accurate information on the population.

Monitoring frequency:

Sampling should begin at least one year prior to road construction (suggest initial transects be set up during road lay-out or surveying). Once the monitoring techniques are finalized the frequency can be decreased to every 3 - 5 years.

Estimated cost: $1,000 per sampling year. Performed in conjunction with other monitoring efforts.

MONITORING PLAN FOR COMMON MERGANSERS ON MONTAGUE ISLAND:

Introduction:

Common mergansers use the snags that are associated with riverine systems for nesting sites. The adults and ducklings both rely on juvenile salmon for their primary food source and require clear water in order to pursue and capture their prey. The Forest Service selected the common merganser as an indicator of the effects of management actions on riverine systems and associated mature forest habitats. This monitoring plan focuses on the brood rearing period of mergansers on the river systems within or near proposed activity sites. Merganser broods rely on the river channels for escape until they can be concealed in dense emergent vegetation. Brood counts are often used as a population index; however, the low density of the population on Montague Island make direct population monitoring impractical. Therefore, monitoring efforts will focus on compliance with the standards and guidelines, and on important habitat characteristcs.

Monitoring methods:

1) Monitor the stability of the Coho salmon juvenile population (See coho monitoring plan).
2) Monitor compliance with standards and guidelines protecting snags in riparian areas.
3) Monitor the continued availability of nesting trees through periodic checks of harvested areas adjacent to riparian zones.

Justification:

Management area standards and guidelines for timber harvest in riparian areas gives special consideration to a minimum of 100 foot area on each side of the stream. Snag guidelines specify that at least 3 snags per acre are retained in riparian areas. Ensuring the availability of nesting habitat and coho juveniles should provide the necessary components to maintain the merganser population.

Estimated Cost:

$1000.00 for the additional time the Timber Sales Administrator may spend assuring the guidelines are met. Other information will be obtained in conjunction with monitoring for coho salmon.

MONITORING PLAN FOR PINK SALMON ON MONTAGUE ISLAND

Introduction:

A primary objective of management activities within the Big Islands Management Area is to maintain or improve the habitat capability for pink salmon. This is closely related to the quality and quantity of the available spawning areas.

Monitoring will insure that proposed land disturbance activities do not adversely effect existing pink salmon spawning habitat. Monitoring will also verify increases in pink salmon habitat capability from the proposed fish habitat improvement projects.

Monitoring Methods:

1. Riparian standards and guidelines have been developed to protect pink salmon spawning habitat within the project area. Monitoring resource development projects will verify that these standards and guidelines were met and that the Standards and Guidelines are sufficient to meet riparian objectives. This monitoring will consist of spot checks of timber harvest units, road crossing structures, and other land disturbing activities. It may also include intensive pre and post activity surveys, depending on the potential for adverse impacts.

2. ADF&G has conducted aerial escapement surveys for pink salmon on 33 index streams on Montague Island since approximately 1966. These surveys, and the associated commercial harvest data provide a relative index of size of the pink salmon populations along the north and west sides of Montague Island. Unfortunately, ADF&G does not survey the south end of the island or the streams along the outside coast.

   ADF&G aerial escapement surveys will be used to identify general population trends for pink salmon on Montague Island. The surveys will also be used to identify specific population trends for index streams which have the potential to be effected by management activities. These streams include: Point Creek (17020), Clam Beach Creek (17030), MacLeod Creek (17070), and Chalmers River (17410). This monitoring technique will not be effective for the majority of streams within the south Montegue project area because these streams are not surveyed by ADF&G.

3. On-the-ground adult escapement surveys will be conducted at representative pink salmon habitat enhancement projects to verify increased production estimates and to identify necessary project design modifications, if any. Survey intensity and duration will be sufficient to verify project benefits and to establish an average expected project life.

4. ADF&G has conducted preemergent fry sampling on numerous streams throughout Prince William Sound annually since approximately 1980 to get an estimate of pink salmon egg-to-fry survival and an index of potential adult production. Four of these index streams are located on the north end of the Montague Island. Unfortunately, none of the streams are in areas which might be effected by proposed management activities.

   ADF&G preemergent fry studies at the four established sites on Montegue Island will be used to establish general egg-to-fry survival estimates and population indices for the project area. Up to three additional preemergent fry sampling sites will be established in drainages with reasonable chances of potential impacts to identify specific project related changes, if any. Additional sample sites will also be developed in representative spawning habitat improvement projects to verify production estimates. Assuming that similiar techniques are used at both the established ADF&G sites and the new preemergent fry sample sites, the survival indices from the additional sites should be correllated to the established sites so that fluctuations caused by natural events such as floods, droughts, or hard freezes can be seperated from human related impacts.

Estimated Costs:

Compliance with Riparian Standards and Guidelines - $1,000 / year*
Monitor ADF&G escapement surveys - $100 / year
On-the-ground escapement surveys - **
Preemergent fry studies - $1,500 / year***

* Cost will depend on the Alternative selected.
** Costs will depend on the number and type of enhancement projects implemented.
*** Costs for this portion will increase depending on the number and type of enhancement projects implemented.

MONITORING PLAN FOR COHO SALMON ON MONTAGUE ISLAND

Introduction:

A primary objective of management activities within the Big Islands Management Area is to maintain or improve the habitat capability for coho salmon. This is closely related to the quality and quantity of juvenile rearing areas.

Monitoring will insure that proposed land disturbance activities do not adversely effect existing coho salmon rearing habitat. Monitoring will also verify increases in coho salmon habitat capability from the proposed fish habitat improvement projects.

Monitoring methods:

1. Riparian standards and guidelines have been developed to protect coho rearing habitat within the project area. Monitoring resource development projects will verify that these standards and guidelines were met and that the Standards and Guidelines are sufficient to meet riparian objectives. This monitoring will consist of spot checks of timber harvest units, road crossing structures, and other land disturbance activities. It may also include intensive pre and post activity surveys, depending on the potential for adverse impacts.

2. Mark/recapture population estimates for coho fry will conducted on up to three selected stream reaches which have the greatest potential for impacts from resource development projects to verify that riparian standards and guidelines are sufficient to meet riparian objectives. At least two, and preferably three mark/recapture estimates taken during the same period in different years should be completed prior to project implementation to provide a pre-project baseline. The number and duration of post project population estimates will depend on the percieved level of impact and the sampling results.

   Mark/recapture estimates will also be completed on representative coho habitat enhancement projects to verify increased production estimates and to identify necessary project design changes, if any.

3. USFS recreational cabin users will be requested to submit Catch-Per-Unit-Effort information for coho to identify gross population trends. This information will be provided to the ADF&G for their use in developing appropriate harvest strategies to maintain high recreational values.

Estimated Cost:

Compliance with Riparian Standards and Guidelines - $1,000 / year*
Mark/Recapture Population Estimates - $1,500 / year***
Monitor CPUE for Recreational Cabin Users- $300 / year

* Cost will depend on the Alternative selected.
*** Costs for this portion will increase depending on the number and type of enhancement projects implemented.

MONITORING PLAN FOR CUTTHROAT TROUT ON MONTAGUE ISLAND

Introduction:

Little is known about the distribution or population characteristics of cutthroat trout on Montague Island. Monitoring will insure that proposed land disturbance activities do not adversely effect existing cutthroat spawning or rearing habitat.

Monitoring methods:

1. Cutthroat trout habitat will be identified during project level design and implementation surveys. Spot checks of timber harvest units, road crossing structures, and other land disturbance activities will verify that standards and guidelines to protect fish habitat were met and that the Standards and Guidelines were sufficient to meet the riparian objectives.

2. USFS recreational cabin users will be requested to submit Catch-Per-Unit-Effort information for cutthroat trout to identify gross population trends. This information will be provided to the ADF&G for their use in developing appropriate harvest strategies to maintain high recreational values.

Estimated Cost:

Compliance with Riparian Standards and Guidelines - $1,000 / year*
Monitor CPUE of Recreational Cabin Users - $200 / year

* Cost will depend on the Alternative selected

Appendix D

Transportation Planning Report

INTRODUCTION

A transportation plan has been established for the Big Islands Management Area in response to concerns by appellants to the Chugach National Forest Land and Resource Management Plan. The appeal settlement agreement states:

> "Transportation Planning - Reasonable alternative transportation systems (e.g., roads, trails, log transfer facilities) will be addressed, including effects on resources. Specific transportation facility locations attributable to individual projects would be addressed in individual project NEPA documents tiered to the MAA and the Plan."

A transportation plan describes the feasibility to establish a network of access opportunities. This is done by identifying all the resources which may need to be transported within the study area. Once identified, a network of feasible route corridors can be created and studied. Alternatives of an environmental statement are analyzed through this network and specific actions are proposed for implementation.

This transportation plan covers all of the Big Island Management Area. Since the Management Area Analysis (MAA) is to disclose the environmental effects of the actions proposed by the Forest Plan as amended by the Settlement Agreement, the transportation plan looks at proposals specifically on southern Montague Island. Until there is direction which prescribes active management of resources of Green, Hinchinbrook and Hawkins Islands there would be no road or log transfer facilities proposed beyond the shores of Montague Island.

Transportation planning for the Big Islands MAA identifies specific road corridors and Log Transfer Facility sites. The broad field of access management includes trails, boat ramps and air and water access points. The location of trails, boat ramps and air and water access points are inseparably associated with recreation management on the Chugach National Forest and were best analyzed with the recreation proposed projects.

The Big Islands MA Transportation Plan also incorporates a request from Chugach Alaska Corporation (CAC) for roaded access across southern Montague Island from the land they own and intend to actively manage around Patton Bay to MacLeod Harbor, another parcel which CAC has schedules for active management.

ISLAND FEASIBILITY SYSTEM

Management Area Wide

The transportation plan is based on the need to establish a network to move resources on an island to points of departure from an island. Once established, a network would be used to look at commodity and personnel movement on routes without leaving the island.

The resources potentially requiring some level of access were timber, minerals and recreation developments. Each was specifically identified during the environmental analysis process. No other resources required a connection to a network of transportation facilities.

Individual timber stands were identified for the suitable timber base.

A mineral survey did not identify any mineral deposits for which we would expect any development on the island at this time.

There are recreation projects identified on Montague Island which are directly tied to the transportation system.

Feasibility networks were not established for all the islands in the management area. Montague Island was the only one to require a transportation network. Hinchinbrook Island was designated PII (Primitive) by the settlement agreement and in doing so transportation systems were excluded from being developed on the island. Green Island is a proposed natural research area, an action not requiring a transportation system. Hawkins Island did not have any actions or resources which requires developing a transportation system.

The entire management area is composed of individual islands. There are only two modes of access to each of the islands, air and water. For both aircraft and boat pilots, landing at the islands is at pilot discretion only. Hinchinbrook Island has one FAA approved site at Johnson Point, which is the only approved aircraft landing site in the Management Area.

Montague Island

Investigating route corridors on an island 50 miles long and 4 to 12 miles wide by foot would take several field seasons. For this plan, a first hand look at the island's terrain was gained by direct observation from over-head aircraft, the Forest's aerial photograph library and topography maps to determine feasible road corridors. Ground inspections were conducted for the Log Transfer Facility (LTF) sites used in this MAA.

The network of feasible route corridors was able to reach all regions of the island. There were cases where limited areas were not identified as being accessed with a route corridor. This can not be interpreted as not having a feasible route corridor, only that at this time there was no reason to investigate the providing access to the area, i.e. no resources were designated for management action.

There are feasible LTF sites at both north and south ends of Montague Island. There is a distinct lack of sites in the middle region of the island on both east and west shores. The feasible LTFs are discussed later in this transportation plan.

Once identified, a route corridor was broken down into segments. The segments could then be attributed for analysis with specific costs. Each segment was classed by function, haul standard, and terrain type. The functional class, arterial, collector and local, provides the breakdown for the overall system and the type of service the route would provide. The haul standard based on lanes, alignment and surface, is the source for haul rate determination. The terrain type is used to determine construction cost.

Route construction cost includes work to establish a running surface and drainage structures less than 35 sq. ft. end area. Larger culverts, arch and multi-plate culverts and bridges were added to the construction as a separate item.

The existing trails on Montague are principally to move people around in a small local area or provide access through private ownership to public land. The existing trails are not used to travel extended distances throughout the island.

LTF construction cost establishes a pad and/or ramp to water the log bundles. No entry machines are included in the cost. Entry machinery would be brought in and taken out with each operator. Dumping and rafting costs associated with the log transfer site were also identified. A towing cost was also used. Towing log rafts was assumed to be to Seward, the closest major processing facility. The mill at Seward is under construction and is assumed to be in operation for this plan.

There are two modes of access to the Montague Island, air and water, from the mainland and surrounding communities.

Commercial and private pilots fly to and land at various points on the island using beaches and ridges at their own discretion. Float planes can land at Stump Lake on Montague Island or protected saltwater coves throughout the Management Area. Stump Lake is the only freshwater lake which is known to be large enough for air operations. Pilots must use their own discretion for any water landing due to rough water conditions on the saltwater and hazards such as submerged stumps and free floating debris in Stump Lake.

The Chugach National Forest does not manage landing facilities for the public use. Feasibility studies would be prepared involving both the transportation planning and recreation sections.

Boat pilots can refer to the Coastal Pilot Guide for direction on getting to the shores of Montague Island. In all cases, boat pilots should use their own discretion and approach the shore with caution. Montague Island, particularly the east coastline, receives debris from the ocean.

TRANSPORTATION PLAN COMPARISON AND FUNCTION

Island Arterial Route

The Montague Island road system would be independent from major highway systems in the State of Alaska. The Island's arterial system is the base to reach water access points and specific inland locations. The location of this route is limited to lower elevations, generally less than 500 ft above sea level and upper beach fringe locations.

Around the southern tip of Montague Island the road has no options for the location other than using the beach location. The only area for alternative location between Patton Bay and MacLeod Harbor is uplands of Jeanie Cove to Patton Bay.

Facilities constructed are long term developments. Assuming resource management would be isolated and scattered around on the island, the arterial could be extended to the north and back to the south to complete a loop of major access for the island.

Island Route Development Patterns

The development of a system of roads on Montague Island is dependent on the location of terminal facilities for resources moving from the island. For Montague Island the key terminal facilities are the Log Transfer Facilities (LTF).

The LTF are discussed in detail later in the plan. The location of all the known feasible sites are at Rocky Bay, Zaikof Bay, Stockdale Harbor, Box Point, unnamed point near Wooded Island (to be referred to as Wooded Island) and MacLeod Harbor (2 sites).

The suitable timber base and existing recreation opportunities identified for this analysis were used to define the road patterns on Montague Island.

An assumption to be made is whenever possible it is economically efficient to move resources to the nearest terminal facilities over the economically easiest road system. Also at some point in the rotation of vegetation management, the feasible LTFs would be available for operation.

Given the above assumptions, a multi-entry analysis using computer modeling of all the available feasible routes can determine efficient roading patterns and probable future use of LTF sites.

Roads connected to terminal facilities on the southern end of Montague Island would extend 12 miles north along the west shoreline from Point Bazil at the north tip of Hanning Bay, and 9 miles north along the east shoreline from Purple Bluffs. All routes beyond these breaks to the north would be connected to northern terminal facilities.

Six of the seven feasible LTF sites are used in the analysis for the movement of resources. Stockdale Harbor was not an economically efficient site to develop a LTF.

Cost Sharing

The arterial route as displayed in Alternatives 4 - 6 is the only known opportunity to develop a cooperative or cost share agreement for road construction, use and maintenance. When a Record of Decision is issued then the share responsibility for the cooperators can be agreed upon. The first step toward an agreement between Chugach Alaska Corporation (CAC) and the Forest Service was a master agreement signed on September 15, 1986. This agreement defines the bounded South Montague Island Agreement Area which encompasses the request for a road by CAC. The agreement does not obligate the Forest Service to implement a road. The agreement structures further investigations of a potential route for joint construction, use and maintenance.

Over the Top

To review a route between the east and west shores we must make the assumption a need exists requiring an east-west route. The reasons may be varied and won't be expanded at this point.

Two feasible routes exist to tie the southeast and southwest regions together. One route is displayed in the Alternatives 4 - 6 (Maps L,M,N) following the beach zone around the southern tip of Montague Island. The other is to go over the mountain ridge which longitudually divides the island.

The feasible mountain corridor uses a pass in the mountain ridgeline which is between the head waters of the Nellie Martin River and MacLeod Harbor at an elevation of 2,000 ft. The vertical climb from road systems on the east and west sides is approximately 1,800 ft.

The route over the mountains requires building on slopes up to 60% in upper slope vegetation and alpine environments. The soil layer is thin. A snow cap is present at the highest elevation for most of the year.

This road would serve as an arterial route. The road alignment includes several switchbacks. Tangent sections of the road are short. Grades would be as great as feasible for log trucks, the most critical vehicle which would use this route. Constructed sustained grades should be expected to be 8 to 12% with pitches to 12 to 18%.

To keep the road surface in good operating condition and snow graded off for a normal operating season, maintenance was estimated to be a minimum of 5 times more costly than a lower elevation route.

A route over the mountains would be approximately 11.5 miles long and cost $4.0 million. The cost per mile is $353,500. In comparison to general road cost at lower elevations excluding beach road, a route over the mountains costs more than twice as much.

Alternatives 4, 5 and 6 display a road following the shoreline around the southern tip of Montague Island. The comparison below is for the segments which interchangably connect road systems developed to access the variety of projects in the alternatives.

Shoreline Route		Mountain Route
8.7	distance (miles)	11.5
$448,900	total const. cost	$4,065,300
$51,600	cost/mile	$353,500
$1.48	haul cost ($//mbf)	$3.67

The conclusion of this analysis indicates as shown in the alternatives the best route on southern Montague Island to go east to west would be the construction of a shoreline route. The shoreline is vastly less costly and there is nearly three miles less environmental impacts.

Multi-Entry Layout Analysis

Multi-entry layout (MEL) is a computer analysis model to determine economic efficiency for construction of road routes for the movement of forest resources, primarily timber.

MEL relates timber and road corridors over a full rotation of the suitable timber base. The first entry represents areas designated for vegetative management for each alternative. For the remainder of the suitable timber, stands were scheduled for harvest over a 100 year rotation. The scheduling of timbered areas is set by the transportation planner to study management strategy for access on Montague Island.

Interdisciplinary input for all resources was used in the development of the alternatives for the life of the MAA. Activities scheduled beyond the life of the MAA plan does not include interdisciplinary input.

Assumptions are necessary to analyze situations for computer modeling. For the Big Islands Management Area the assumptions are listed below.

1. During the decades when the entry comes from 2 or more zones, the stands from each zone entered would be proportional to relative sizes of each based on the stand volumes.

2. Harvest areas have been designated for each alternative for the life of the MAA plan. The remaining stands would constitute the future entries.

3. All stands in the suitable timber base would be scheduled and assigned to one of the entries as portrayed in the MEL table. (Figure X)

4. The Present Worth for the timber value on any road considers all volume in any period accessed without necessitating additional Forest Development Road (FDR) construction.

5. The base year in the MEL analysis is 1990. The discount rate is 4%.

6. The value of the timber is the pond value of $340.77.

The timber which is accessed is further refined according to the fourth assumption. The following table displays the rotation used to compare the alternatives.

Alt.	Decade - Volume (mbf)		
2	1986 - 20,975.1	2036 - 4,391.7	2056 - 4,400.9
3	1986 - 30,918.3	2026 - 14,840.5	2056 - 15,008.6
4	1986 - 28,622.0	2026 - 21,325.0	2056 - 21,855.5
5	1986 - 35,919.0	2026 - 23,744.8	2056 - 26,292.5
6	1986 - 36,768.5	2026 - 24,560.6	2056 - 20,450.4
7	1986 - 0.0		

The MEL analysis costs include road construction, log haul, LTF construction and dumping and rafting. The domestic destination is expected to be Seward.

The Present Worth (PW) for the MEL analysis is shown below for each alternative.

Alt.	PW
2	+ 3,854,606
3	+ 7,294,234
4	+ 5,660,709
5	+ 8,032,420
6	+ 8,461,803
7	0

Table 3 is the schedule of timber throughout the rotation used during preparing the MEL analysis.

Unit Costs for the Analysis

The costs developed for this analysis and shown in the following tables were constructed using the Engineers Guide for Estimating Costs of Survey, Design and Construction of Roads and Bridges, Dec. 1, 1988. No update factor has been used with this table since update factors change periodically and these figures are for analytical purposes.

The table displaying road construction cost by Terrain Type is a method of being specific in a plan about the ground a proposed road may be constructed on. Terrain Types are classifications based on geographic description and soil productivity type. This work is prepared for island conditions as are found in Prince William Sound.

Unit Cost Table 1

Raft Towing

Sawlog towing	0-50 miles	$0.1574/mbf/mile
	51-100 miles	0.1060/mbf/mile
	100+ miles	0.0979/mbf/mile
Pulp log towing	0-50 miles	$0.1255/mbf/mile
	51-100 miles	0.1135/mbf/mile
	100+ miles	0.1054/mbf/mile
Log towing fixed add-on cost		$1.78/mbf
LTF, Dump & Raft		$5.69/mbf

Construction Cost by Design Standard

S14-10	(See Table 2)
S14-20	(See Table 2)
S16-20	(See Table 2)
S16-30	(See Table 2)

Road Development costs

Unclassified Excavation	$3.80/cy	Bridge - 60 ft	$97,000
Commom Excavation	$0.95/cy	Bridge - 70 ft	$130,000
Rock Excavation	$7.66/cy	Bridge - 80 ft	$145,000
Rock Borrow	$5.71/cy	Bridge - 90 ft	$150,000
Haul	$1.08/cy	Bridge - 130 ft	$163,000
Clearing	$2,965.00/ac	Rip Rap - Class VI	$30.81/cy
Seeding	$1,104.00/ac	Aggregate, Pit Run	$10.16/cy
CMP 18"-24"	$27.88/lf		
CMP 36"-84"	$94.74/lf		

TERRAIN TYPE III

DESCRIPTION: Moderate to steep sideslopes 40% to 55%. Broken profile with numerous moderate to deep V-notches. Through cuts and through fills are used to avoid excessive grade rolling.

SOIL PRODUCTIVITY TYPE: 85% commercial timber (2 ft overlay), 15% scrub timber (3 ft overlay).

GEOGRAPHY: Mid to upper slopes.

TERRAIN TYPE IV

DESCRIPTION: Steep sideslopes 55% and greater.

SOIL PRODUCTIVITY TYPE: 75% commercial timber (2 ft overlay), 25% scrub timber (3 ft overlay).

GEOGRAPHY: Upper slopes and steep beach areas.

TERRAIN TYPE V

DESCRIPTION: Generally flat sideslopes with some sections up to 10%. Ground profile will be gently rolling allowing a road grade to follow the ground profile with minimum depth overlay. Natural ground solid and stable. Limited organic and soil layer depth over cobbles, boulders and bedrock.

SOIL PRODUCTIVITY TYPE: 75% barren ground (2 ft overlay), 25% scrub timber (2 ft overlay).

GEOGRAPHY: Open beach, uplifted beach and beach fringe areas.

TERRAIN TYPE VI

DESCRIPTION: Steep sideslopes greater than 65%. Natural ground solid and stable. Limited organic and soil layer depth over bedrock.

SOIL PRODUCTIVITY TYPE: 25% commercial timber (2 ft overlay), 50% alpine low brush vegetation (2 ft overlay), 25% barren ground (2 ft overlay).

GEOGRAPHY: Alpine areas.

TERRAIN TYPE I

DESCRIPTION: Generally flat with some sections up to 20%. Ground profile gently rolling, allowing road grade to follow profile with minimum depth overlay. Occasional moderate V-Notch up to 15 feet deep.

SOIL PRODUCTIVITY TYPE: 30% muskeg (4 ft overlay), 50% scrub timber (3 ft overly), 20 % commercial timber (2 ft overlay).

GEOGRAPHY: Inland valley bottom.

TERRAIN TYPE 1A

DESCRIPTION: Same as Type 1, except for an increase in the amount of muskeg.

SOIL PRODUCTIVITY TYPE: 60% muskeg (4 ft overlay), 35% scrub timber (3 ft overlay), 5 % commercial timber (2 ft overlay).

GEOGRAPHY: Inland valley bottom.

TERRAIN TYPE 1B

DESCRIPTION: Same as Type 1, except for a decrease in the amount of muskeg.

SOIL PRODUCTIVITY TYPE: 10% muskeg (4 ft overlay), 30% scrub timber (3 ft overlay), 60% commercial timber (2 ft overlay).

GEOGRAPHY: Inland valley bottom.

TERRAIN TYPE II

DESCRIPTION: Moderately steep side slopes between 20% and 40%. Numerous moderate V-notches up to 20 feet deep. Rolling grade and alignment adjusted to fit terrain features.

SOIL PRODUCTIVITY TYPE: Scrub timber 25% (3 ft overlay), commercial timber 75% (2 ft overlay).

GEOGRAPHY: Mid lower slope and upper end valleys.

TABLE 2
TERRAIN TYPES for PRINCE WILLIAM SOUND

Construction cost December 1988
$ per mile

Terrain Type	S-10 14	S-20 14	S-20 16
I	148,612	151,888	165,507
IA	158,120	161,126	173,574
IB	136,241	139,711	152,956
II	142,808	152,825	170,467
III	160,292	177,516	202,659
IV	206,871	240,179	270,094
V	37,249	47,183	51,337
VI	211,895	316,938	369,690

Average of Terrain Types for Prince William Sound
$ per mile

All	150,261	173,421	194,536

Average for Analytical Road based on all Terrain Types and Design Standards.

Average $ per Mile, Prince William Sound

$172,739

PREPARED BY WARREN OJA ON 3/20/89

MEL SCHEDULE FOR MONTAGUE ISLAND

SUITABLE ACRES = 13,950 SUITABLE VOLUME = 322 MMBF

	ALTERNATIVES													
	1		2		3		4		5		6		7	
YEAR	MMBF	AREA	MMBF	AREA	MMBF	AREA	MMBF	AREA	MMBF	AREA	MMBF	AREA	MMBF	AREA
0 (1986-1995)	0	-	21	1	31	1	29	1	36	1	36	1	0	-
10 (1996-2005)	0	-	60	3,4,5	29	4	29	4	30	4	30	4	70	1,2,3
20 (2006-2015)	0	-	0	-	29	2,5	29	2,5	30	2,5	30	2,5	0	-
30 (2016-2025)	0	-	60	2,3	29	3	29	3	30	3	30	3	50	4,5
40 (2026-2035)	0	-	0	-	29	1	29	1	30	1	30	1	0	-
50 (2036-2045)	0	-	60	1,2,4	29	2,3	29	2,3	30	2,3	30	2,3	50	1,2
60 (2046-2055)	0	-	0	-	29	4	29	4	30	4	30	4	0	-
70 (2056-2065)	0	-	60	1,4,5	29	1	29	1	30	1	30	1	50	1,3,4
80 (2066-2075)	0	-	0	-	29	4,5	30	4,5	30	4,5	30	4,5	42	4,5
90 (2076-2085)	0	-	61	2,3	60	2,3	60	2,3	60	2,3	60	2,3	60	2,3
TOTAL ROTATION	0		322		322		322		322		322		322	

Table 3

AREAS CORRESPOND TO AREAS DELINEATED ON SUITABLE LAND BASE MAP OF MONTAGUE ISLAND (1 INCH = 1 MILE)

NUMBER OF ENTRIES PER AREA

AREA 1 = 3 HARVEST ENTRIES
AREA 2 = 3 HARVEST ENTRIES
AREA 3 = 3 HARVEST ENTRIES
AREA 4 = 3 HARVEST ENTRIES
AREA 5 = 2 HARVEST ENTRIES
AREA 6 = 0 HARVEST ENTRIES (NO SUITABLE LANDS DURING THIS PLANNING PERIOD)

LOG TRANSFER FACILITIES (LTF)

Environmental Consequences of the environmental effects from LTFs are spoken to in Chapter 4. This section of the transportation plan concentrates on fully describing the sites and facilities.

Feasible LTF sites, southern Montague Island

Physical feasibility identification for LTF sites was made by using aerial photos, topography maps, off-shore depth charts, previous studies and on-site ground verification.

Four sites have been identified as having potential for LTF development along the shore of southern Montague Island between Purple Bluffs on the east shore and Hanning Bay on the West. The sites are 1) North MacLeod Harbor, 2) South MacLeod Harbor, 3) unnamed point across from Wooded Island near Stump Lake (named Wooded Island for this report) and 4) Box Point.

More work would need to be prepared for the design and construction of an LTF. What work has to be accomplished would depend on the site. The MacLeod Harbor sites have been dove, while the outside sites have not. Some wind and wave action work has been done for Box Point, but not for the other sites.

Site Descriptions

North MacLeod Harbor

This site is located on the north side of the harbor adjacent to the uplands owned by Chugach Alaska Corporation. A slide, gravity or mechanical, is the proposed mechanical system. A LTF located here would not require the construction of a breakwater. This is a previously used site, last used in the mid-1970s.

This site has been investigate for re-use by Alaska F&G, USF&WS and NMFS in June 1986 and reported in September 1986 along with 4 other sites along the southern shore of the harbor. A copy of the report is included in this chapter following the site sketches.

There is approximately 500 ft between the LTF site and the timbered sideslopes too steep to use for site development. A low standard inactive private road which is approximately 0.5 miles long connects to this site.

Offshore water depths taken from the dive report are -5 ft at 85 ft and -40 ft at 200 ft.

South MacLeod Harbor

This site is located on the southern shore of MacLeod Harbor. As recorded in the 1986 dive report mentioned above, this is at or near site 3. The beach at this point is large and flat with out vegetative cover.

The immediate uplands to this site is land managed by the Forest Service. It is part of the 1964 uplifted beach fringe zone covered with brush and thickets. The fringe zones is backed with timbered slopes too steep for development for the LTF. There is sufficient room to develop a 10 acre log storage area.

Offshore water depth is -5 ft at 875 ft, -20 ft at 1,000 ft and -60 ft at 1,300 ft.

Wooded Island

This site is located at the south end of Patton Bay on the east side of Montague Island. The uplands are managed by the Forest Service.

The immediate upland is a flat low point of land extending toward Wooded Islands. Vegetation cover is grasses. The proposed site is at the end of the point of land.

Off shore water depth is -5 ft at 1,200 ft, -40 ft at 5,280 ft and -60 ft at 6,800 ft.

Box Point

This proposal is located on a land projection north of Patton Bay, facing into Patton Bay. The adjacent uplands are owned by Chugach Alaska Corporation.

The site is at the south tip of the land at Box Point near to pinnacle towers of rock. The lowland in the adjacent area and site are beach fringe zones approximately 300 feet wide backed by steep bare slopes. The top of the slopes is near the 100 ft elevation contour.

Offshore water depth is -5 ft at 300 ft, -40 ft at 2,100 ft and -60 ft at 2,300 ft.

Site Comparison Chart

Site	Upland Log Storage	Off Shore Quality	Cost	Site Quality	Site Rank
North MacLeod	good 1/	good	8.2 (Low)	good	2
South MacLeod	excellent	good	192.4	excellent	1
Wooded Island	excellent	poor	523.0 (Hi)	fair	4
Box Point	fair 1/	good	306.0	good	3

1/ The uplands involved with this site are owned by Chugach Alaska Corp. Use of this site would require a cooperative agreement.

Log Transfer Facility Types

LTFs can generally be grouped into three separate classes. There are two wet transfer types, ramp/slide and lift-off facilities. The third is dry tranfer of logs most commonly using a barging facility. Here is a brief discussions of the three types.

Ramps/Slides

Ramps/slides is a group of very similar devises to transfer log bundles from land to water. A ramp can be used by itself or to provide the foundation for a slide entry system.

Ramps by themselves are used for using the ebb and flow of the tides to transfer wood. This is known as hydraulic lift. At low tide an operator begins placing log bundles on the ramp at waters edge, sitting each bundle next to the previous one. As the tide comes in the bundles are floated off the ramp and can be pulled out to the rafting area.

Slides can be of two types, gravity and mechanical. Either slide design uses the ramp then places structures on the surface which would cause the bundles to move over the ramp to the water.

A gravity slide is constructed at such an angle that allows the weight of the bundle to over come friction and move down the ramp without mechanical assistance. This design has to consider the material the rails are made of, steel for example. Designed properly, the bundle enter the water at an acceptable rate of speed.

A mechanical slide can vary in its approach to enter bundles into the water. A chain drive unit cradles bundles and lowers them into the water at a controlled rate of speed. Another mechanical slide is constructed similar to a gravity system but less than 10% grade. This angle is not enough to allow gravity to move the bundles. A loader sets the bundles on the rails and pushes them at a controlled rate into the water.

Lift-off

There are two common approaches to used by operators for transferring bundles to the water. One is to bring a crane onto the facility, the other is to use a gantry machine.

Cranes are able to lift the heaviest loads hauled by off-highway log trucks. The crane itself has mobility limited to the size of the pad. The crane can lift and maneuver a load. Entry of a bundle into the water is under a controlled rate of speed. Cranes are often used on facilities which need to transfer a large number of log bundles a day or a number of years.

Gantry machines come in two types, static or mobile framed. A common name for this type of machine is an A-Frame due to its construction configuration. Both systems are capable of lifting the heavier loads carried by off-highway log trucks.

The single A-Frame is anchored to the ground making it static in position. A bundle of logs is lifted from the truck and swung out to and lowered into the water. The operator has control of the load and water entry is under controlled rate of speed.

The mobile A-Frame is a dual framed system with one anchored static A-Frame and the other mobile controlling lifting and moving of the load. The operator has an increased amount of control with this configuration from point of lift to water entry.

Barging

Barging is a general term referring to a range of ships with a single task of carrying commodities, in this case harvested wood in the round or after primary manufacture. The term barge can refer to trans-oceanic ships with holds designed to accomodate logs to flat top barges which require another ship or tug for propulsion and crew accomodations.

Even though shipping barges can be loaded from either wet of dry transfer facilities, they are a requirement for a dry transfer LTF to be functional.

Barging is a method commonly used for the transfer of logs to distant markets or milling destinations. For short distances, less than a few hundred miles, barging is not normally used the transport logs. Much of the reason for this is expense. The transporting and handling and loading the logs to the barges is approximately 100% more costly than raft construction and towing.

Elements which have to be considered when deciding whether to barge or tow logs is the distance and water conditions getting to the destination.

The site conditions which influence the construction of land based facilities for dry transfer to barges also have to be considered. Construction of a LTF for dry transfer and barge docking are also approximately 100% more expensive than a comparative LTF for wet transfer of logs.

Assumptions for planning LTF sites

1. Ramp/slide log entry devises would be planned for sites associated with the uplands under the juridiction of the US Forest Service, instead of lift-off devises or dry transfer barge facility unless ramp/slides are not feasible.

2. All the material necessary to construct the LTF facility is available in the planning area.

3. The log entry devise is not considered part of the LTF facility. This is equipment installed by the contractors.

4. The conceptual design for North MacLeod Harbor was provided by Paul Tweiten, Timber Division Manager for Chugach Alaska Corporation as part of his EPA/COE permit application.

5. The breakwaters structures used in this plan are not intended to prevent all wave action from entering the protected harbor area. It is to be expected that large storm activity may generate some waves which may break over the breakwater. The force of the waves is expected to be diminished to an acceptable level within the harbor.

6. Unit costs for the cost estimates are taken from the current R10 Engineering Cost Estimating Guide. The costs are used as current time and are not present in an economic analysis standard form.

7. Armour Rock and Rip Rap are not depicting the some material, though both are able to effectively provide some protection from the elements.

8. Structures built at the edge of or in shallow saltwater along the eastern shoreline of Montague Island are exposed to harsh environmental elements, wind and waves being the major considerations. Constructed in this environment without surface protection shortens the expected life span.

9. A limited amount of work has been done at the sites presented in this plan, upland investigate plus in MacLeod Harbor subsurface investigation. Information such as wind and wave patterns and forces have not been prepared for all sites. In 1975, CH2M Hill prepared a report for the Forest Service for a LTF at Box Point which included wind and wave patterns and force. This information still has some value. More work is required before constructing a LTF on uplands managed by the Forest Service.

10. Facility life expectancy is 20 years.

11. The Forest Service would try to work jointly with other land owners on Montague Island wherever possible to share in the use of feasible LTF sites due to the limited sites available.

Previous LTF Studies

The Forest Service contracted with CH2M Hill Engineering of Alaska, Inc. on October 22, 1974 to prepare a study for a barge loading facility in Patten Bay. A report of the finding for the study was issued on March 14, 1975.

For the study the Forest Service established the following criteria for the log-loading facility.

1. Logs would be transferred in bundles with maximum weigths of fifty tons each.

2. Access from the beach to the transfer point shall include a road 14 feet wide with 8% maximum grade and 50 ft minimum curve radius.

3. Storage at the transfer site shall be 70,000 sq. ft. with an average loading of 400 psf.

4. The berth and harbor shall be designed for a tug and barge with a maximum draft fo 14 feet and maximum size of 70 ft by 320 ft, without a self-mounted crane.

5. The season of use would be May 1 to November 30.

6. Economic life of the facility shall be a minimum of fifty years.

7. Maximum acceptable delay in loading shall be five continous days due to sea and/or swell conditions.

8. Associated support traffic at the site is not anticipated.

9. The facility would be constructed in the Patton Bay - Wooded Islands area of Montague Island.

The study prepared sea wind roses off Patton Bay, wave height frequency analysis, wave refraction analysis, project layouts and estimated capital cost.

The study's chosen site is on the south side of box point to take advantage of natural terrain to minimize costs. The study proposes a breakwater to be constructed for harbor protection and a loading station with a sheet piling face for ship docking and loading. The study proposed bringing 357,000 cu. yd. of rock to the site from the Kenai Peninsula or other location in Prince William Sound to supplement quarry rock available in the cliffs at the site.

CH2M Hill's concluded in their 34 page study report:

> "Our analusis of the area, based on operating criteria furnished us indicates that an all weather harbor and a barge loading facility are engineerly feasible within Patton Bay. The cost of such development is tentatively described at about $22,000,000.00."

The estimated capital cost is broken down as follows:

Embankment, Local Rock	$ 7,455,000
Imported Revetment Rock	8,562,000
Sheet Piling	1,736,000
Engineering, Contingencies and Int @ 25%	4,438,000
Total Estimated Capital Cost	$22,191,000

A complete copy of this report would be entered into the administrative record for this environmental impact statement.

LTF Location Influence on Road System Development

From the viewpoint of a road system, a review is necessary to identify LTF preferences. Its logical to expect the removal of commodities, (timber, mineral, etc.) would naturally tend to go to the closest island exit facility, i.e. LTF. If we are to look at the suitable timber on southern Montague Island as divided by the central mountain ridge the timber is located in the southeast and southwest sections of the island.

Patton Bay to MacLeod Harbor Tie

The Present Worth for wood harvested from CAC land at Patten Bay and delivered to Seward is shown below.

Thru LTF at Box Point	$ 3,632,890
Thru LTF at No. MacLeod Harbor (Alt 5 Route)	$ 8,350,998
Thru LTF at No. MacLeod Harbor (Alt 6 Route)	$ 8,216,494

This shows an estimated $4.6 million could be invested toward building an LTF at Box Point rather than investing the same amount in road construction and operating costs through North MacLeod Harbor. This is the savings from not constructing a tie road and not operating out of MacLeod Harbor.

An LTF constructed at a cost of up to $4.6 million at Box Point would put investment and operation cost on an equal base with MacLeod Harbor.

The analysis dated May 28, 1989 which arrived at the above summary contains the assumptions and calculations used and would be entered in the administrative planning records for the EIS.

Alternative Comparisons

Alternatives 4 - 6 are the only options with actions which could use an east side LTF. In alternatives 4 - 6, the net values are greater and positive when using the Box Point LTF. Alternative 4 net value with the Wooded Island LTF is negative. A comparison is shown below.

Box Point	Alternative	Wooded Island
$1,063,056	4	-$163,132
1,971,368	5	741,039
1,942,603	6	710,762

Based on this analysis, Box Point is preferable to develop as LTF compared to Wooded Island. Box Point also has the better overall site condition of the two.

The two MacLeod Harbor sites have nearly equal net values when compared to one another. The North MacLeod site is a reconstruction project where South MacLeod is new construction. The difference in net value is the cost of road construction added for the NorthMacLeod Harbor LTF. The haul cost difference is small.

North MacLeod	Alternative	South MacLeod
$2,065,377	2	$2,190,437
4,280,752	3	4,409,498
2,260,725	4	2,388,614
4,020,069	5	4,150,686
3,935,644	6	4,000,488

The two MacLeod Harbor sites have similar overall site quality as well. Each has specific advantages, but none would prohibit use or development. Two conditions are, South MacLeod has a larger area for upland log storage and sorting, North MacLeod has a steeper underwater ground slope.

LTF Net Value Determination

Net value determination used for the alternative comparisons is not the same as Present Worth or Present Net Value. The net value is not time discounted, it assumes instantaneous costs and values. The net value is the value minus the costs which can be associated with an action.

Timber value is $340.77/mbf. Motorized Recreational Visitor Days are $8.26/RVD. The road costs used in the calculations are the haul cost, construction cost, LTF construction cost, dumping and rafting and towing cost.

The costs displayed arrived at using the listed quantities and unit prices taken from the current Region 10 Engineers Guide for Estimatine Costs of Survey, Design and Construction of Roads and Bridges. The effective date is December 1,1988.

The unit price for Rip Rap is for machine placed Class VI Rip Rap. The size gradient for Class VI Rip Rap like all other classed is detailed in Section 619 of the Forest Service Specifications for Construction of Roads and Bridges, April 1985.

No update factors have been used in the cost displays. This purpose of the tables is for analytic computations and coupled with the current date of the cost guide update factors were not used.

Present LTF Conceptual Proposals

For each of the sites written about a conceptual design has been prepared to provide a base to estimate material quantities and costs. The figures following this presentation on LTFs are those conceptual designs.

Also included is a copy of the dive report for the MacLeod Harbor sites. No dives made been made on Box Point or Wooded Island for this report.

North MacLeod Harbor (See Figure 1)

An entry ramp would be 160 feet long and 30 feet wide to support a mechanical slide entry devise. A log storage and handling area would be immediately adjacent to the LTF approximately 5-6 acres in size.

This is a naturally protected site, so no armour rock, rip rap or other protection measures would have to be used.

South MacLeod Harbor (See Figure 2)

A handling pad and ramp would be necessary for operating on this site. The end of the ramp at the -5 ft level is 875 ft from the shore where upland vegetation is established.

The ramp is designed for a mechanical slide entry devise with up to 10% grade on the ramp. This site could also be used to construct a facility for a lift off entry devise. The most economic system is the slide devise.

This site is located in the harbor to provide sufficient protection from wave action erosion without using rip rap or a breakwater.

A 10 acre log storage and handling area can be developed immediately adjacent to the beach zone for this site.

Wooded Island (See Figure 3)

The conceptual design proposed a 2,100 ft breakwater sitting on the sand spit connecting Wooded Island to Montague Island. The LTF would be a ramp design for a slide, gravity or mechanical, entry devise.

The proposal is for a ramp 1,500 ft long and 30 ft wide. This is the minimum length a ramp can be built to be functional as a hydraulic lift or slide facility. At 1,500 ft the end of the ramp/slide is at MLLW elevation of 0.00 feet. A more functional ramp/slide would extend 2,000 ft in length placing the operating level of the ramp/slide at -5 ft elevation. The operating grade of the ramp/slide is to be 10%. Rip Rap would be necessary to protect the ramp.

Adequate protection is expected for the ramp and associated rafting activities with the breakwater and rip rap surfacing.

Box Point (See Figure 4 and 5)

The LTF would be a ramp design for a slide, gravity or mechanical, entry devise. This site is directly exposed to weather conditions from the Gulf of Alaska. A breakwater would be required for protection at this site.

Work prepared at this site in 1972 indicated the minimum length a breakwater to be constructed at this site is 900 ft. This plan uses the 900 ft as minimum acceptable length for a breakwater required for site protection.

The proposal involves constructing a ramp 800 ft long and 30 ft wide from the current shoreline. This is the minimum length a ramp can be built to be functional as a hydraulic lift or slide facility. At 800 ft the end of the ramp/slide is at MLLW elevation of 0.00 feet. A more functional ramp/slide would extend 1,500 ft in length placing the operating level of the ramp/slide at -5 ft elevation. The operating grade of the ramp/slide is to be 10%.

Rip Rap would be use to protect the ramp. Along with the breakwater, sufficient protection would be provided for the ramp and rafting areas.

The Draft EIS proposed a conceptual design with the breakwater a minimum length. Log storage would be on the north side of the point at least a 0.5 mile distance from the LTF using locally available rock for development.

Visual inspection by air indicate quarry rock is available near the site. No additional borrow haul would be included as at the other sites. This is confirmed by the CH2M Hill report in 1975 and the Forest Service work in 1972.

As was previously discussed CH2M Hill investigation looked at a more expansive facility. If we apply the $4.6 million previously identified by not roading to MacLeod Harbor a more expansive facility can be developed that the minimum facility shown in the DEIS. The assumptions are listed at the start of this section of the plan.

Figure 5 is a copy of an aerial photo of Box Point with the ramp, breakwater and log storage areas drawn on it to show the facility which could be developed if an additional $4.6 million is applied.

The breakwater would be constructed at least 2,000 feet out from the point at a southwesterly direction. The wind roses and wave deflection patterns in the CH2M Hill report indicates the direction needing the direct protection is from the southeast. Indirect protection from lesser wind and waves would be provided from the east and south.

The ramp and 1 acre pad would not change from the previous proposal in figure 4.

The log storage area would be constructed using rock fill to a size of 10 acres. The area would require some tidal zone fill. The storage area would be within 0.3 miles of the ramp

The estimated cost for the larger facility shown in figure 5 is:

Breakwater	$3,392,000
Ramp and 1 acre pad	$ 737,000
Log Storage area	$ 136,000
Total Estimated cost	$4,265,000

A 2,000 feet breakwater, oriented as suggested, directly in the path of a southeast source of waves would provide 90 acres of protected water. Both the log storage area and LTF ramp and pad are within the protected water area.

Box Point Proposal Comparisons

A comparison of the CH2M Hill study and the proposal for this EIS needs to be made due to the price difference to implement a LTF at Box Point.

	BI MA EIS	CH2M Hill
Price	$4,265,000	$22,000,000
Life of LTF	20 yrs.	50 yrs.
Transfer Type	Wet	Dry
Breakwater Length	2,000 ft.	1,900 ft
LTF log storage	1 ac.	1.5 ac
Log Storage Area	10 ac @ 0.3 mi.	none
Protected Water	90 ac.	95 ac.
Construction Material	Local	Local & Imported

LTF Conclusion

MacLeod Harbor sites are similar in several ways in physical site characteristics, off-shore environment and economic viability. The dive report for this area described and spoke to these comparisons. The dive report did prefer the North MacLeod Harbor site for implementation and shared by all users on the island.

Box Point is physically and economically viable. Constructing a road from the Patten Bay area on the east side of Montague Island to MacLeod Harbor on the west side instead of using Box Point does not present a savings in terms of physical or economic impacts. This conclusion is made realizing off-shore dives have to be made before Box Point could be implemented and that the sub-surface marine environment is not totally known. Physical indications are there are no problems.

Wooded Island is physically and economically viable. It is the least attractive of the feasible sites and should be the last site to try and implement.

Quantities Comparison Table
(in cubic yards)

Site	Embankment	Haul	Rip Rap
North MacLeod	1,200	1,200	0
South MacLeod	28,337	28,337	0
Wooded Island	48,444	48,444	6,300
Box Point - 900' Breakwater	29,023	0	4,044
Box Point - 2,000' Breakwater	162,766	0	52,407

Economic Comparison Table
(in $1,000.00)

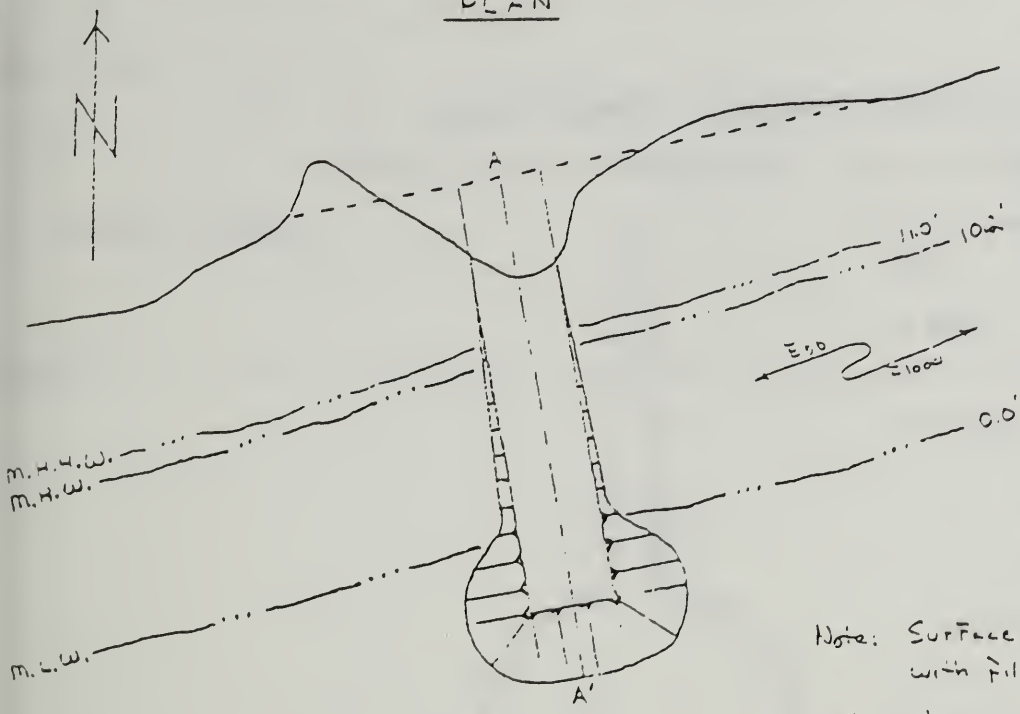
Site	Embankment	Haul	Rip Rap
North MacLeod	6.9	1.3	0
South MacLeod	161.8	30.6	0
Wooded Island	276.6	52.3	194.1
Box Point - 900' Breakwater	165.7	0	124.6
Box Point - 2,000' Breakwater	2,650.3	0	1,614.7

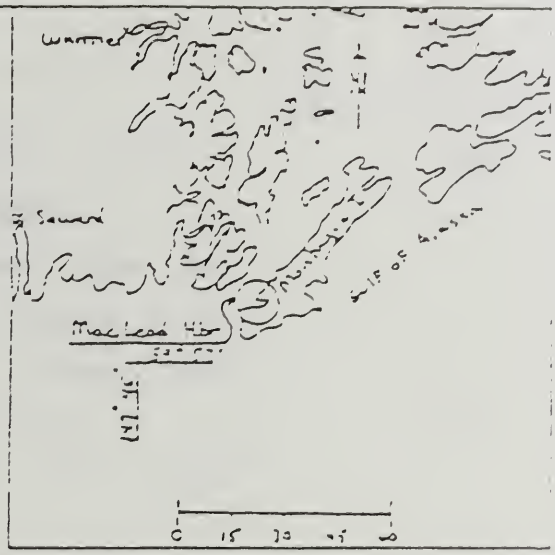
TOTAL COST
(per $1,000.00)

North MacLeod	$ 8.2
South MacLeod	$192.4
Wooded Island	$523.0
Box Point - 900' Breakwater	$290.0
Box Point - 2,000' Breakwater	$4,265.0

LTF MACLEOD HARBOR NORTH SIDE

PLAN





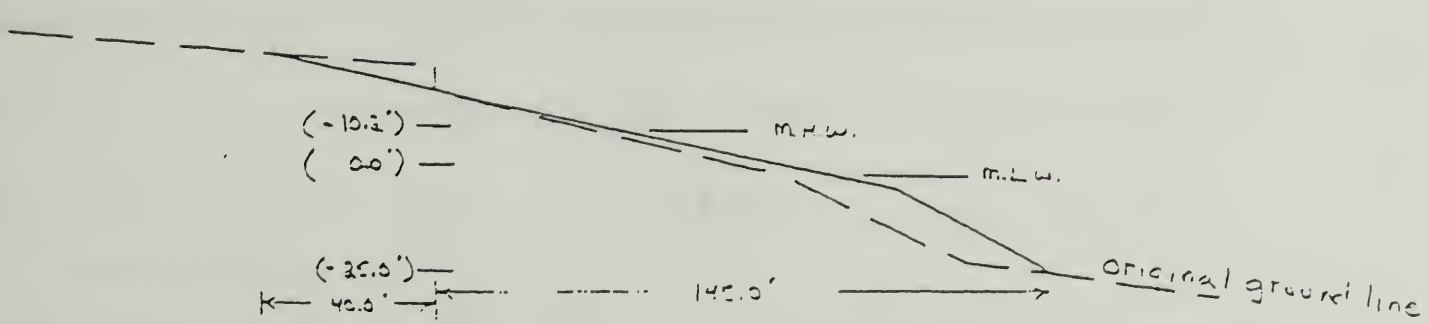
0 78
Scale in feet

Note: Surface of ramp measures: 30 ft x 160 ft with fill slopes placed at 1¼ : 1.

Note: Approximately 1,200 cu. yds. of rock fill will be utilized in this project.

Note: Upland ownership is Chugach Alaska Corporation.

ELEVATION (AA')



Note: Approximately 195 ft ~~total~~ distance to -40 ft depth.

CHUGACH ALASKA CORPORATION
3000 A ST. SUITE 300
ANCHORAGE, ALASKA 99503

Proposed Log Transfer Facility consisting of rock fill and steel rails placed at 15% gradient for non-violent movement of logs to water. Located on the north side of MacLeod Harbor on Montague Island, Alaska.

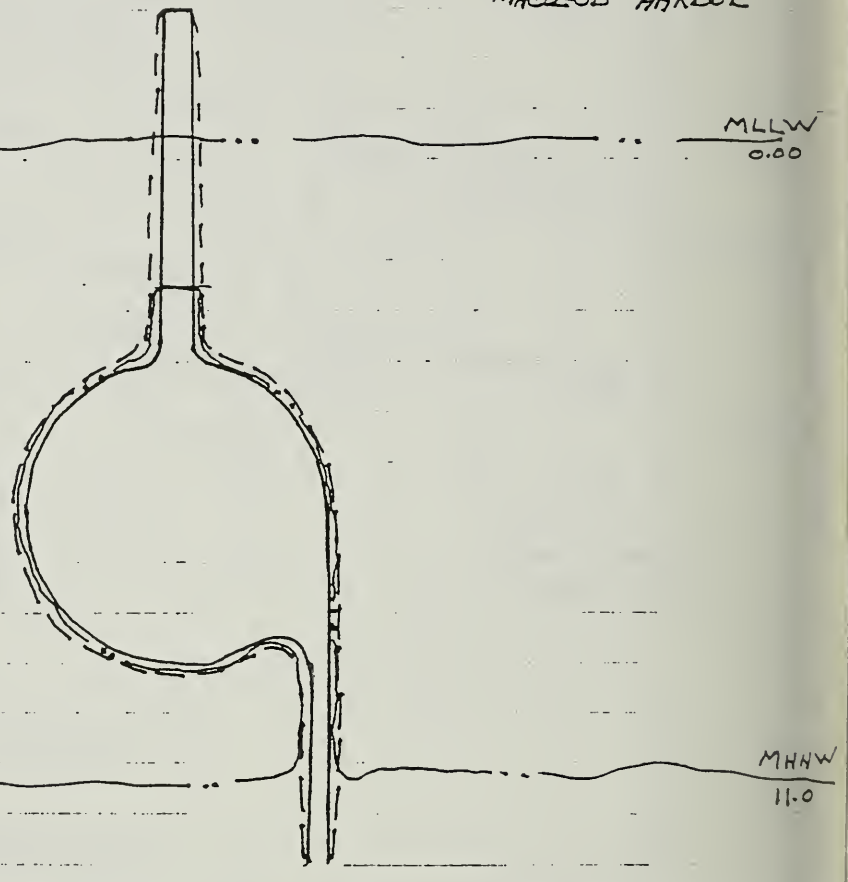
Sheet #2

FIGURE 1

SAM GRIMES
1-11-89

LTF, MACLEOD HARBOR SOUTH SIDE
RAMP - SLIDE FACILITY

END RAMP ELEV: -5 FT
RAMP GRADE: -7%
RAMP LENGTH: 325 FT
RAMP WIDTH: 24 FT
PAD ELEV: +15 FT
PAD GRADE: 0 %
PAD DIAMETER: 300 FT



PAD AND RAMP CONSTRUCTION: $192,400 (28,337 cy)

ESTIMATED COST = $192,400

ROAD: COST INCLUDED WITH ACCESS LINK

STEEL RAILS TO INSTALL IN RAMP FOR SLIDE NOT INCLUDED WITH COSTS, THEY (3 RAILS OR TUBES) TO BE BROUGHT IN WITH THE OPERATOR.

FIGURE 2-1

SAM GRIMES

1-11-89

LTF, MACLEOD HARBOR. SOUTH SIDE
RAMP - SLIDE . FALITY

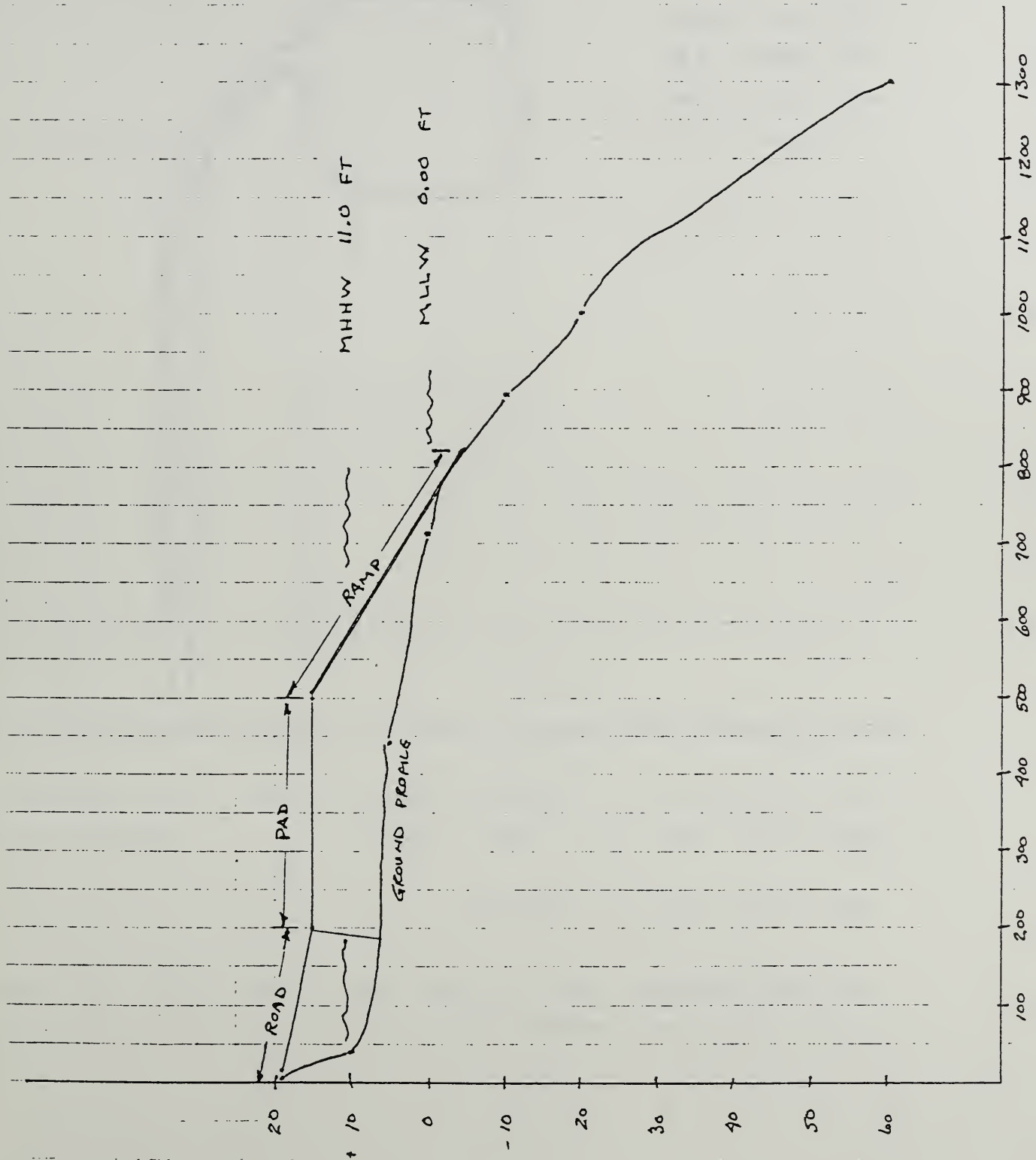


FIGURE 2-2

3 4

SAM GRIMES

1-11-89

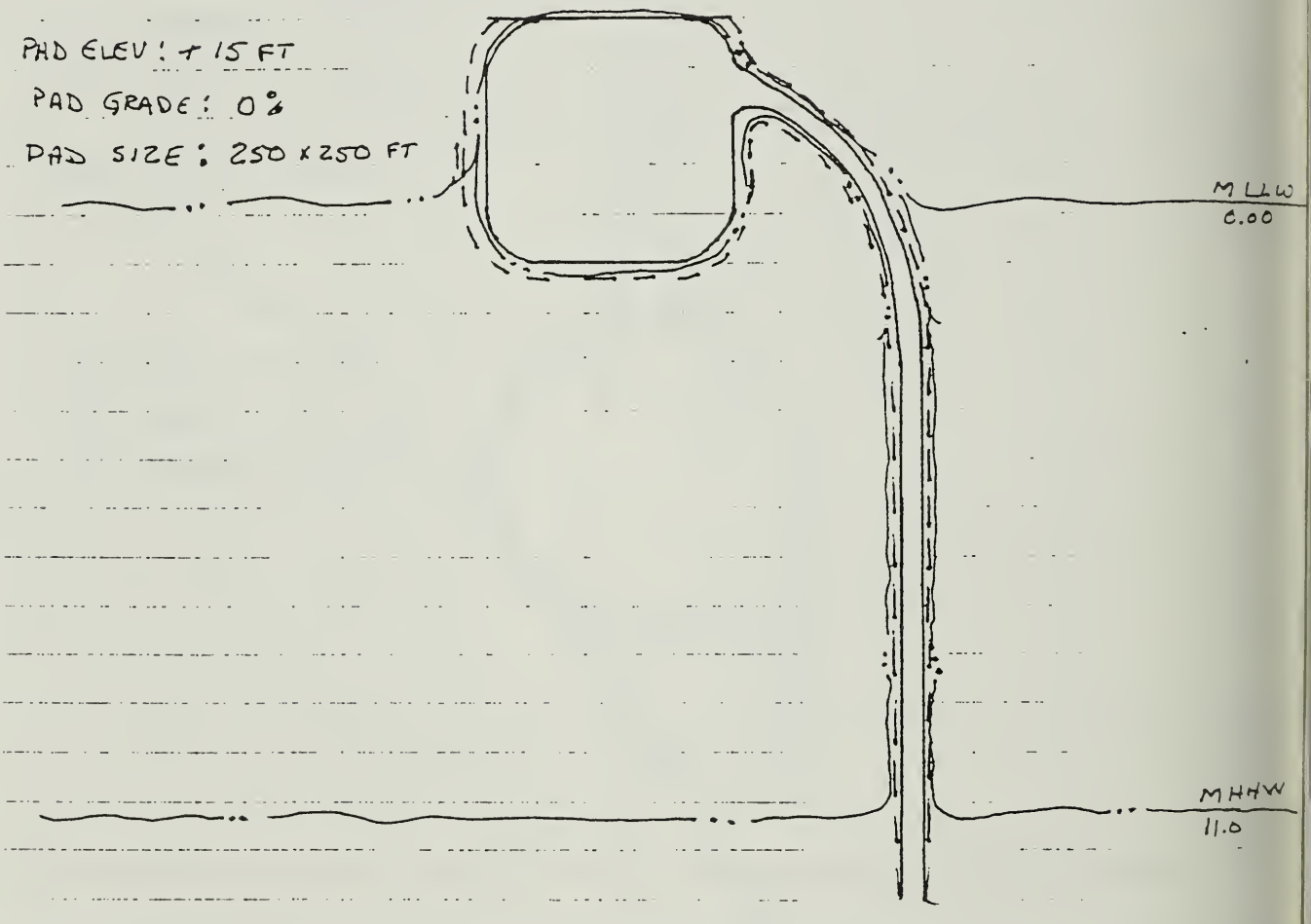
LTF, MACLEOD HARBOR SOUTH SIDE
A-FRAME FACILITY

FACE DEPTH: -10 FT

PAD ELEV: +15 FT

PAD GRADE: 0%

PAD SIZE: 250 x 250 FT



PAD CONSTRUCTION : $ 32,340 (46,000 cy) ROAD : COST INCLUDED WITH ACCESS LINK

SHEET PILE FACE = $ 9,400 (250 FT)

ESTIMATED COST = $ 321,740

LIFT-OFF A-FRAME NOT INCLUDED WITH COST, SINCE ITS BROUGHT IN WITH THE OPERATOR.

FIGURE 2-3

4 4

SAM GRIMES

1-11-89

LTF, MACLEOD HARBOR SOUTH SIDE

A-FRAME FACILITY

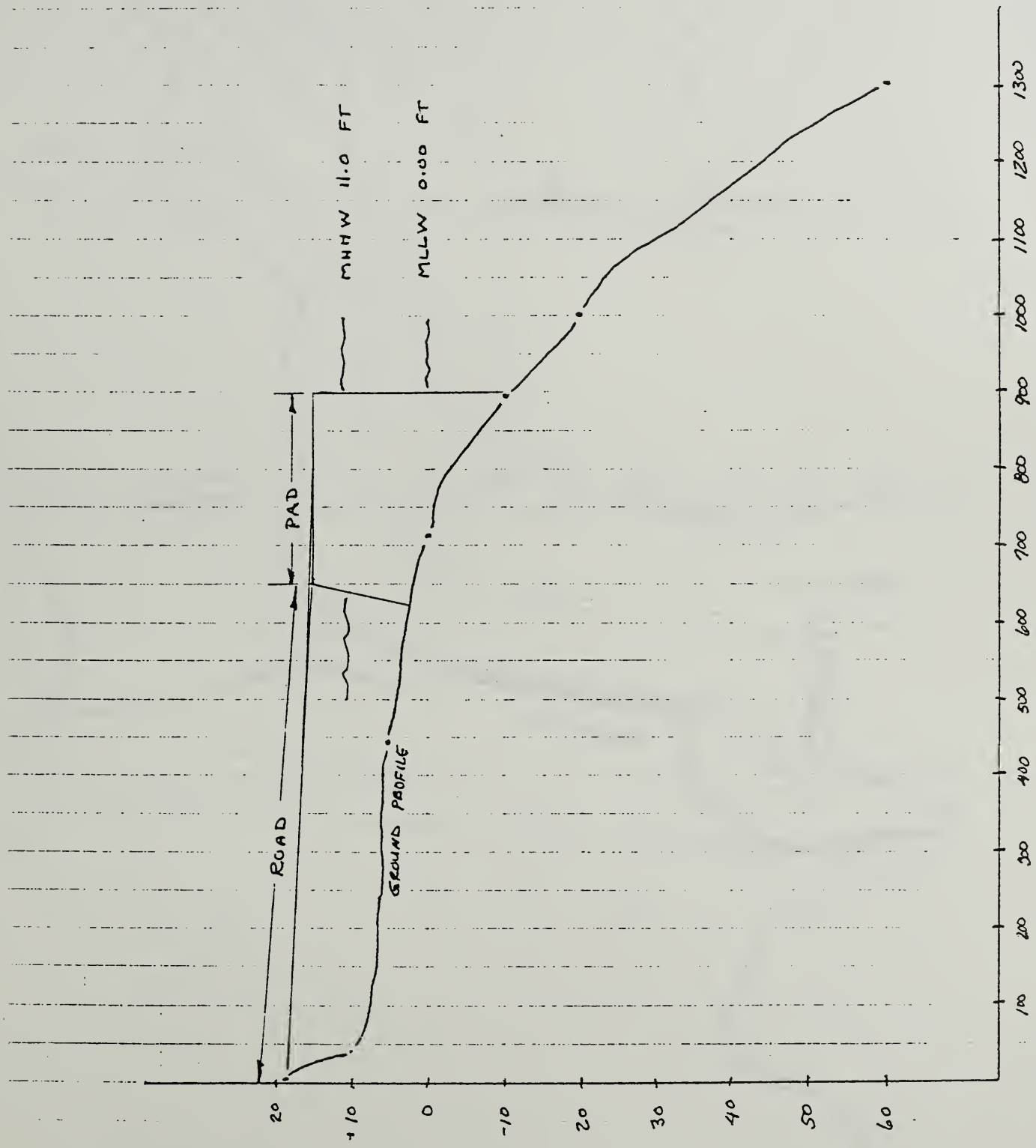


FIGURE 2-4

1 2

SAM GRIMES
2-2-89

LTF, WOODED ISLAND

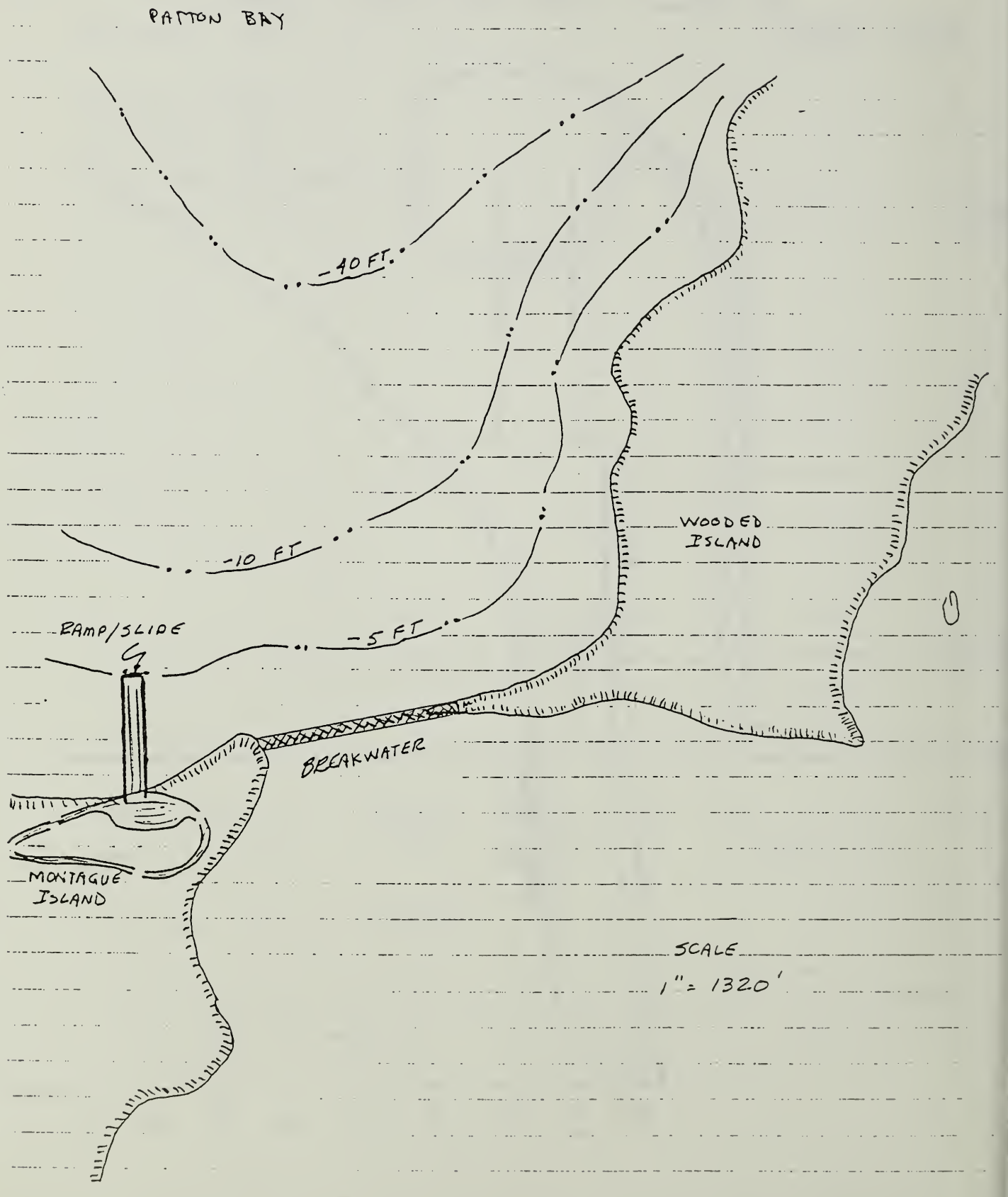


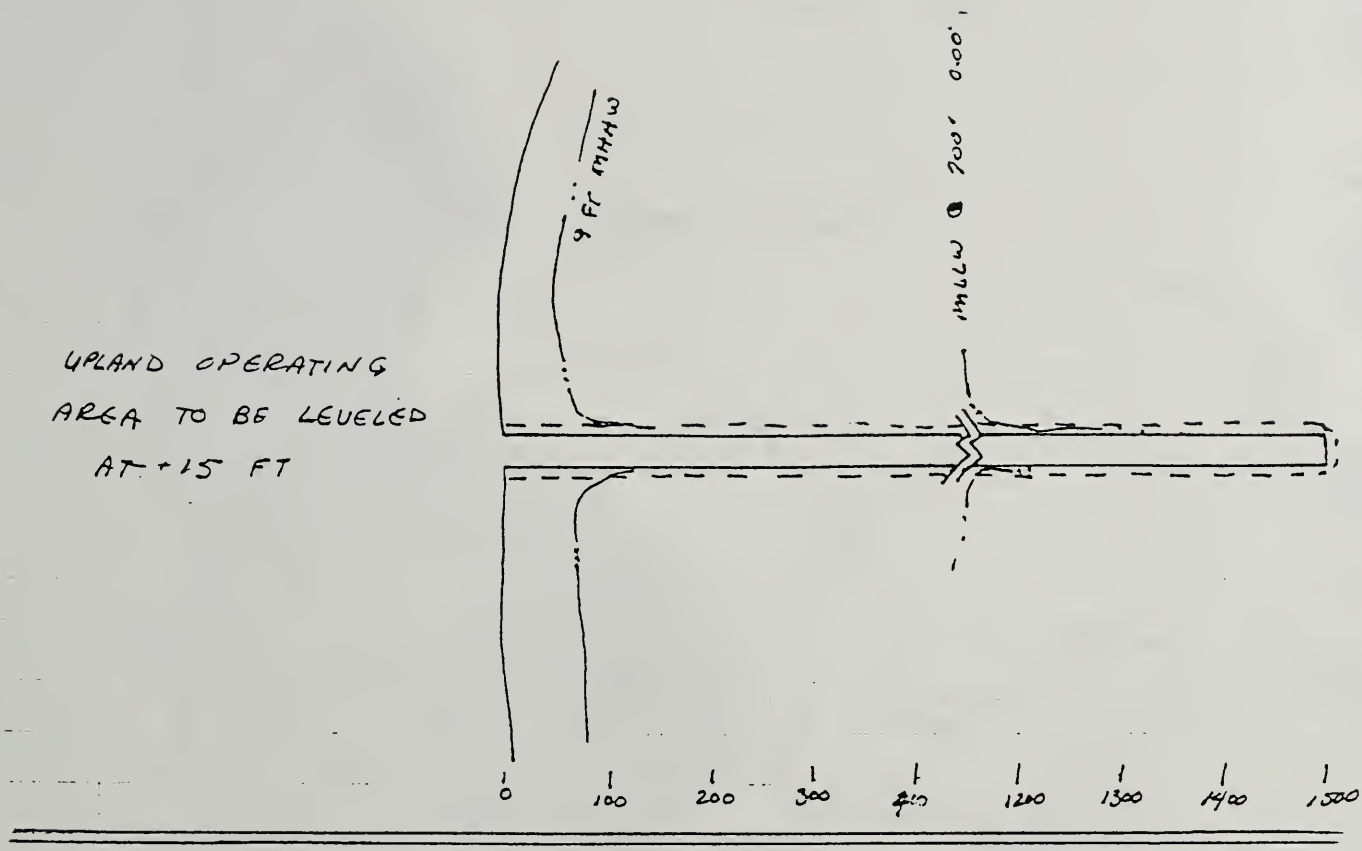
FIGURE 3-1

2 2

SAM GRIMES

2-2-89

LTF, WOODED ISLAND



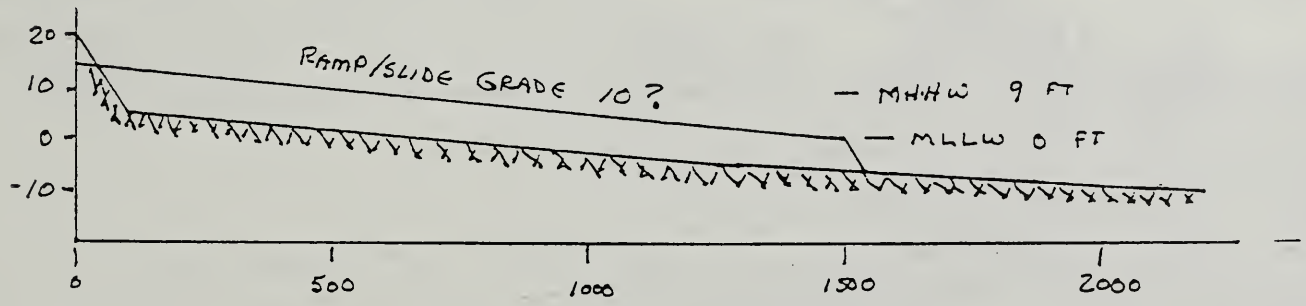
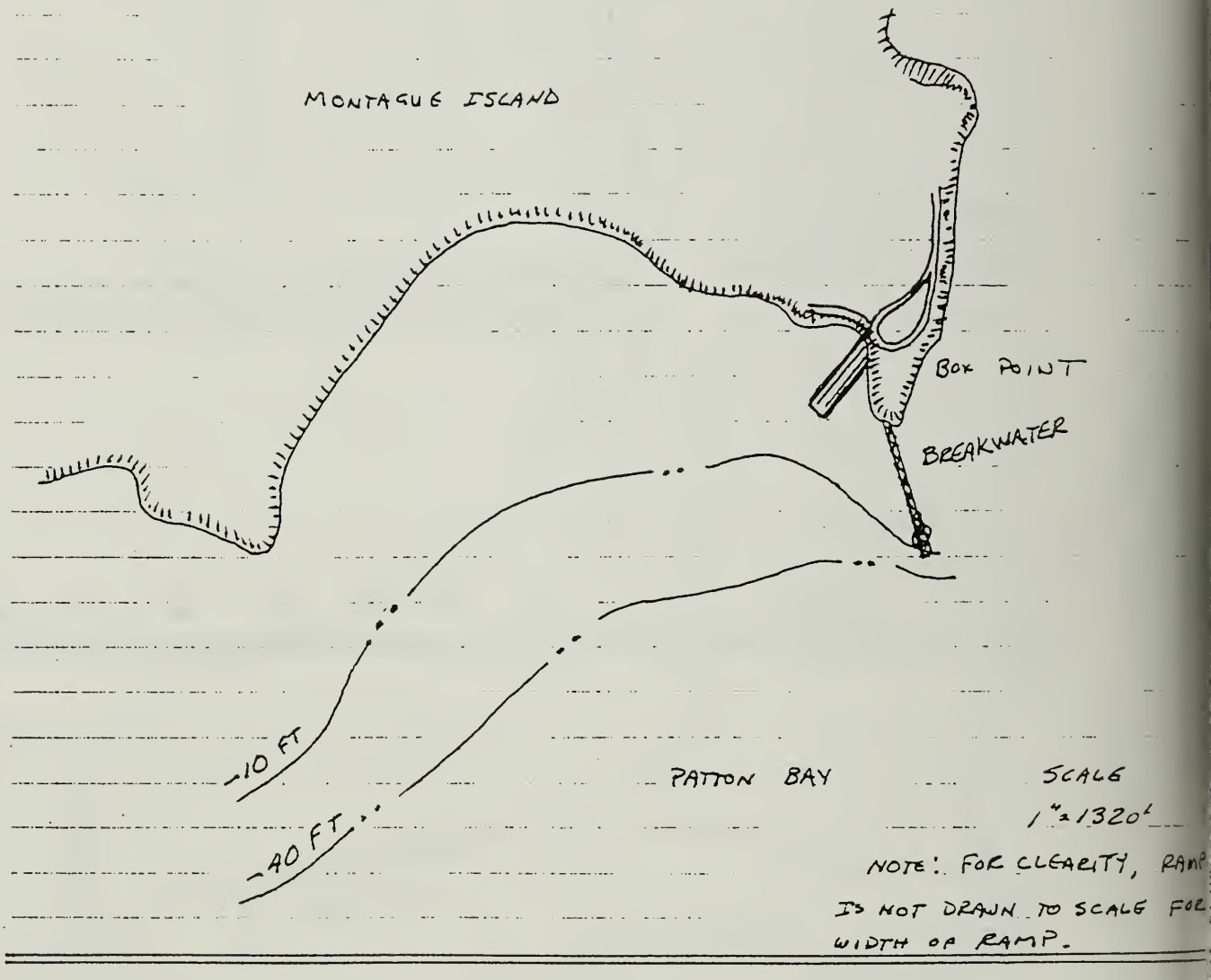


FIGURE 3-2

SAM GRIMES
2-3-89

LTF, BOX POINT



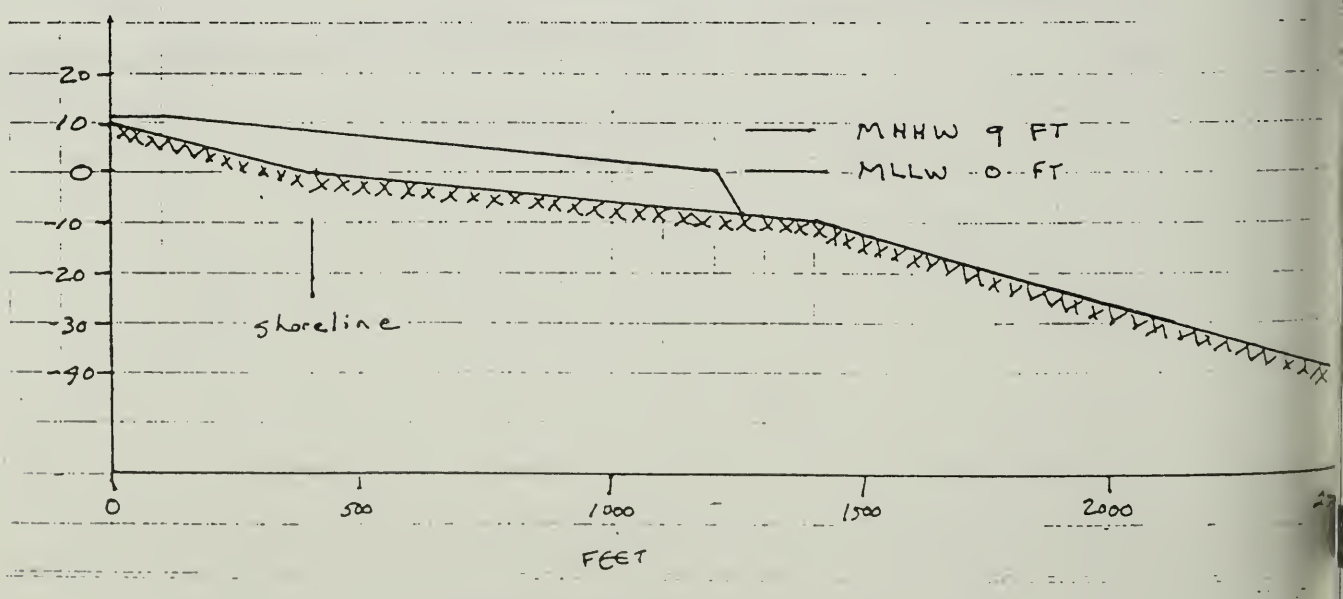


FIGURE 4

FIGURE 5

Log Transfer Facility - Preliminary Site Investigation
MacLeod Harbor, Montague Island
June 24-25, 1986

Introduction:

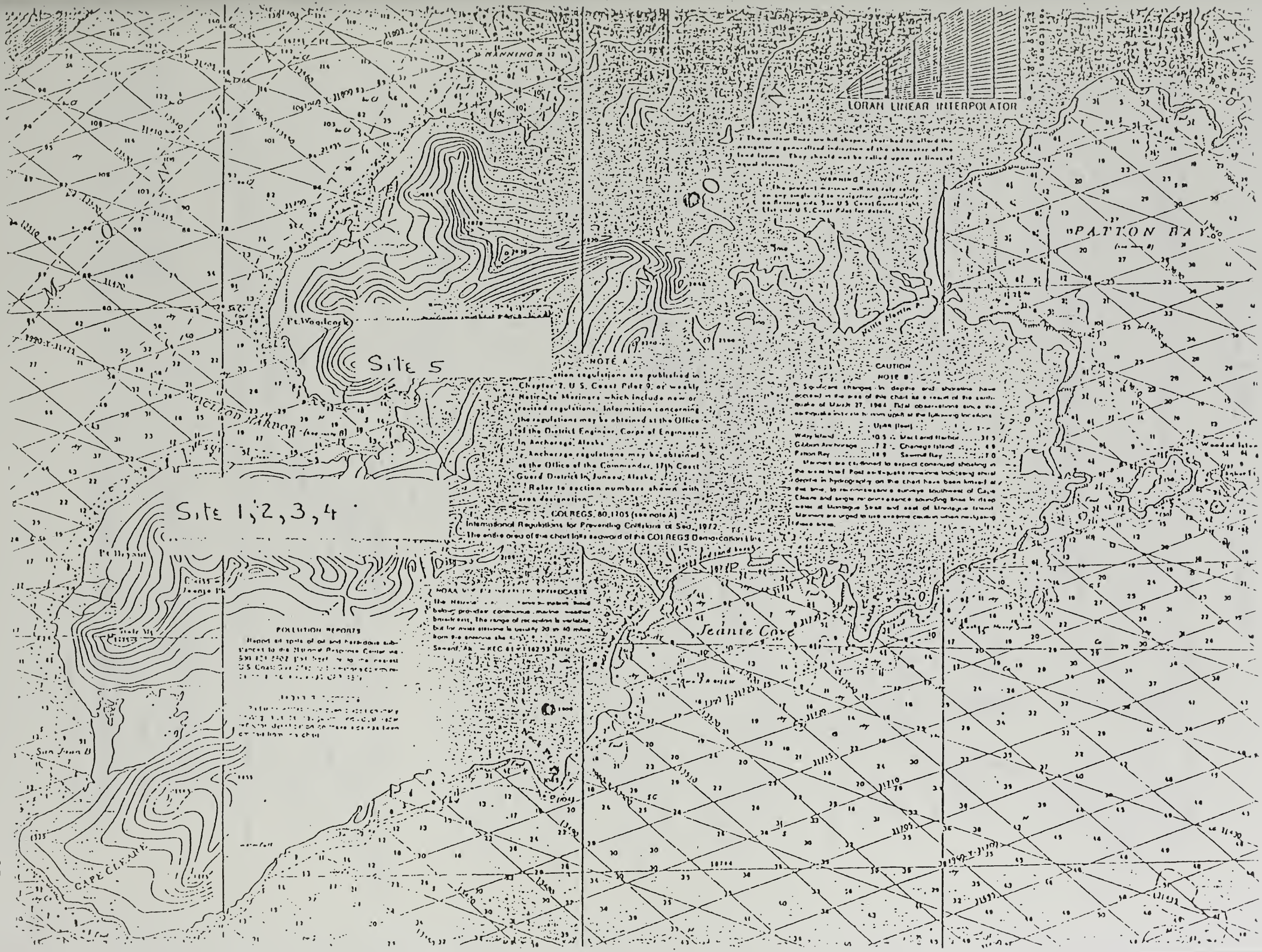
In response to a request from the Chugach Alaska Corporation (Chugach), a team of biologist/divers from the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and National Marine Fisheries Service conducted a preliminary field investigation of potential log transfer facilities (LTF) at MacLeod Harbor, Montague Island, Alaska. Chugach owns approximately 14,000 acres of land on the south and east sides of Montague Island and plans to cut 150 million board feet (MMBF) of timber over a 7 to 10 year period. The U.S. Forest Service also has plans to log Montague Island, and anticipates cutting a maximum of 36 MMBF beginning in 1992. Chugach is working with the U.S. Forest Service to consolidate facilities.

A joint sort yard and transfer site are planned. Potential LTF sites exist in both Patton Bay on the east side of Montague Island and in MacLeod Harbor to the west (Fig. 1). The Patton Bay site is exposed to substantial wind/wave action, and Chugach does not feel it is as feasible a location as MacLeod Harbor. Initial investigations, therefore, are confined to the latter area.

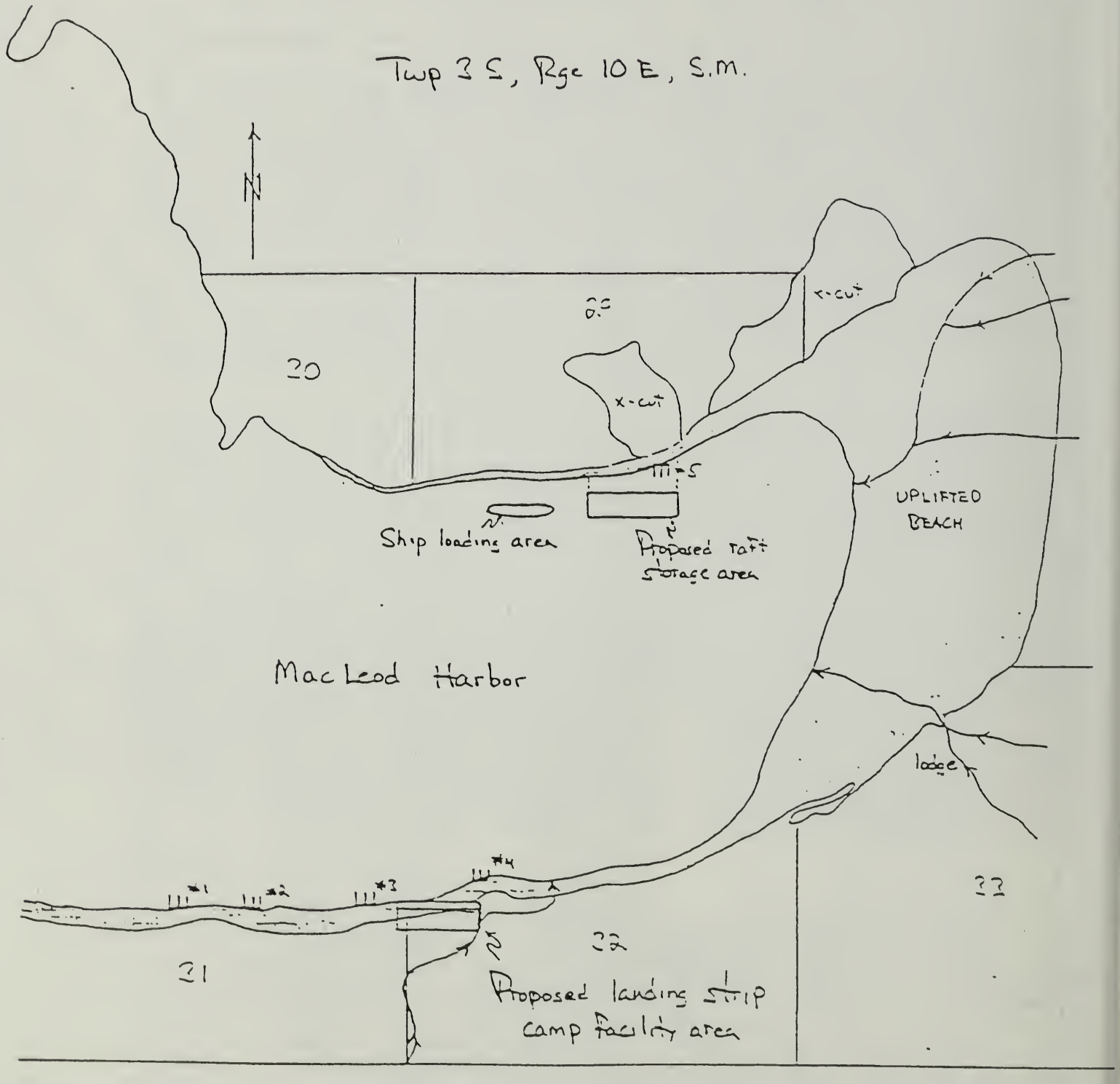
A 28-31 mile logging road would be constructed between cutting areas near Patton Bay and MacLeod Harbor. At MacLeod Harbor a campsite of approximately 50 people, sort yard, LTF, and log storage areas would be constructed (Fig 2). The agency review team considered several potential LTF sites and associated facilities (log storage areas, sort yards, roads, and drainage control facilities) on the north and south shorelines of MacLeod Harbor. A series of minus tides facilitated investigation of the intertidal regions, while SCUBA was used for subtidal work.

General Observations:

Four potential sites were initially identified on the south shore of MacLeod Harbor (Fig. 2). The two outermost sites, sites numbered 1 and 2, were deemed marginal because of exposure to wind/wave action, and subtidal transects were not conducted. Sites 3 and 4 afforded better wind/wave protection and had more useable adjacent upland; therefore, these were considered further. Following examination of the intertidal region of the entire south beach and subtidal examination of site 3, the interagency team concluded the differences between sites 3 and 4 would be minimal. This conclusion is based on the homogeneous nature of the intertidal and subtidal substrate, the small distance between sites 3 and 4, and the general paucity of macroflora and macrofauna on the south shore.


LORAN LINEAR INTERPOLATOR
PATTON BAY
Site 5
Site 1,2,3,4
Jeanie Cove
CAPE CLEARE
Pt. Woolcock
NOTE A
CAUTION
NOTE B
POLLUTION REPORTS
International Regulations for Preventing Collisions at Sea, 1972

MONTAGUE ISLAND



III - Terminal Transfer Facility Alternatives

↗ - Stream

≈ - Uplifted Beach, 1964 Earthquake

x-cut - 1975 Harvest Unit

Scale: 1 inch = approx. 2000 ft

The entire south shoreline of MacLeod Harbor consists of a very wide, low-profile beach (approximately 4 percent slope) uplifted during the 1964 earthquake. The intertidal zone was composed of firm sands with occasional intrusions of small gravels. Coarser substrates are found towards the mouth of the harbor. The only intertidal vegetation consisted of a small patch of rockweed (Fucus sp.) attached to a rock outcropping near site 1. No kelps were observed along the southern shore.

Due to the similarity of sites 3 and 4, only one subtidal transect was conducted (at site 3). It commenced at the estimated zero tide line (MLLW) and carried seaward for 300 feet. The substrate was homogenous sand. Attached flora and fauna were sparse (Fig. 3). Most organisms observed were motile species such as jellyfish, starry flounder, and hermit crabs. Personnel from a nearby lodge have found razor clams in this vicinity. Several live clam siphons were observed by the interagency review team in depths of 20-30 feet of water between 150-200 feet from the mean lower low water mark.

Site 5 is on the north shore of MacLeod Harbor at a location previously used as an LTF during a 1975 harvesting operation (Fig. 2). The intertidal area graded between 3-12 inch diameter rock. Subtidal transects were conducted off the old LTF face (Fig. 4) and near a proposed in-water storage site, approximately 400 feet to the west (Fig. 5). The sites display similar depth profiles and community structure characteristic of many shorelines in Prince William Sound. A broad Fucus/Balanus zone extends from the intertidal to approximately -3 feet (MLLW). Below this, the kelp Laminaria dominated to approximately 30 feet in depth. Substrates were predominately composed of fine sands and silt below 10 feet. No bark was observed at this site, although some cable and other old logging debris occurred. The sea floor sloped steeply in this area, reaching a depth of -51 feet near the end of the transect. Several juvenile Tanner crabs (Chionoecetes bairdi) were observed at 40-45 foot depths at the western-most site.

Discussion/ Recommendations

In evaluating the feasibility of potential LTF sites, many factors are considered. These factors include biological criteria such as intertidal and subtidal resources, algal beds, important fish, shellfish, or invertebrate resources or habitat, important commercial, sport, or subsistence fishing areas, proximity to anadromous fish streams, and the location of any bald eagle nests. Abiotic factors considered include the distance of the LTF to deep water, the slope and substrate at the site, exposure to wind and wave action, the degree of existing impacts, site access impacts, and other technical requirements such as adequate area for construction of sort yards, storage areas, and drainage control/sediment basin structures. The Governors Timber Task force has adopted such

Figure 3.

SITE 3

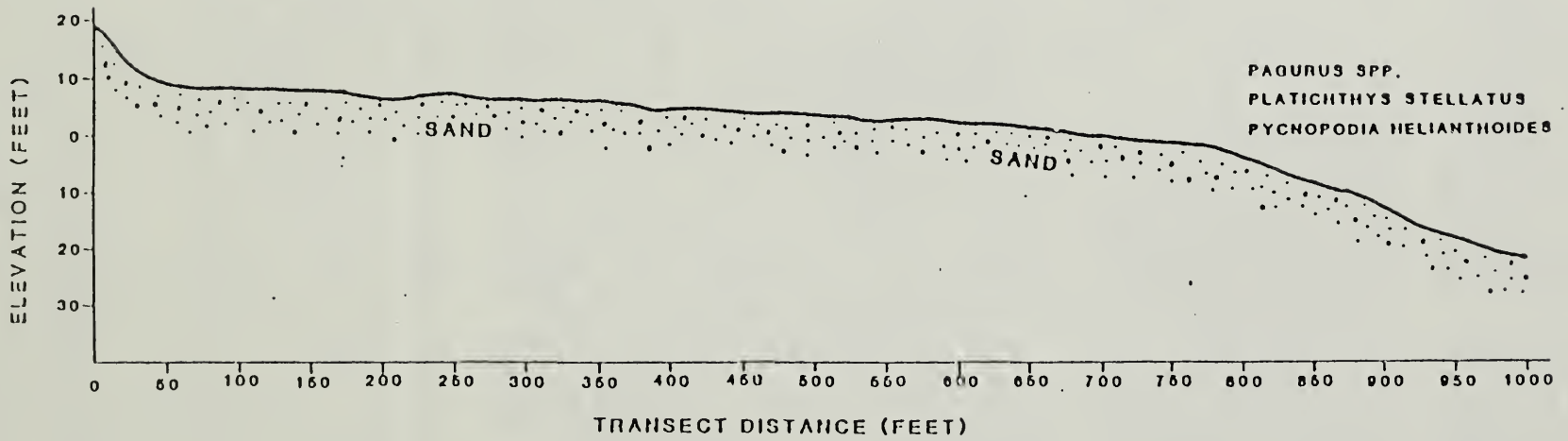


Figure 4.

SITE 5

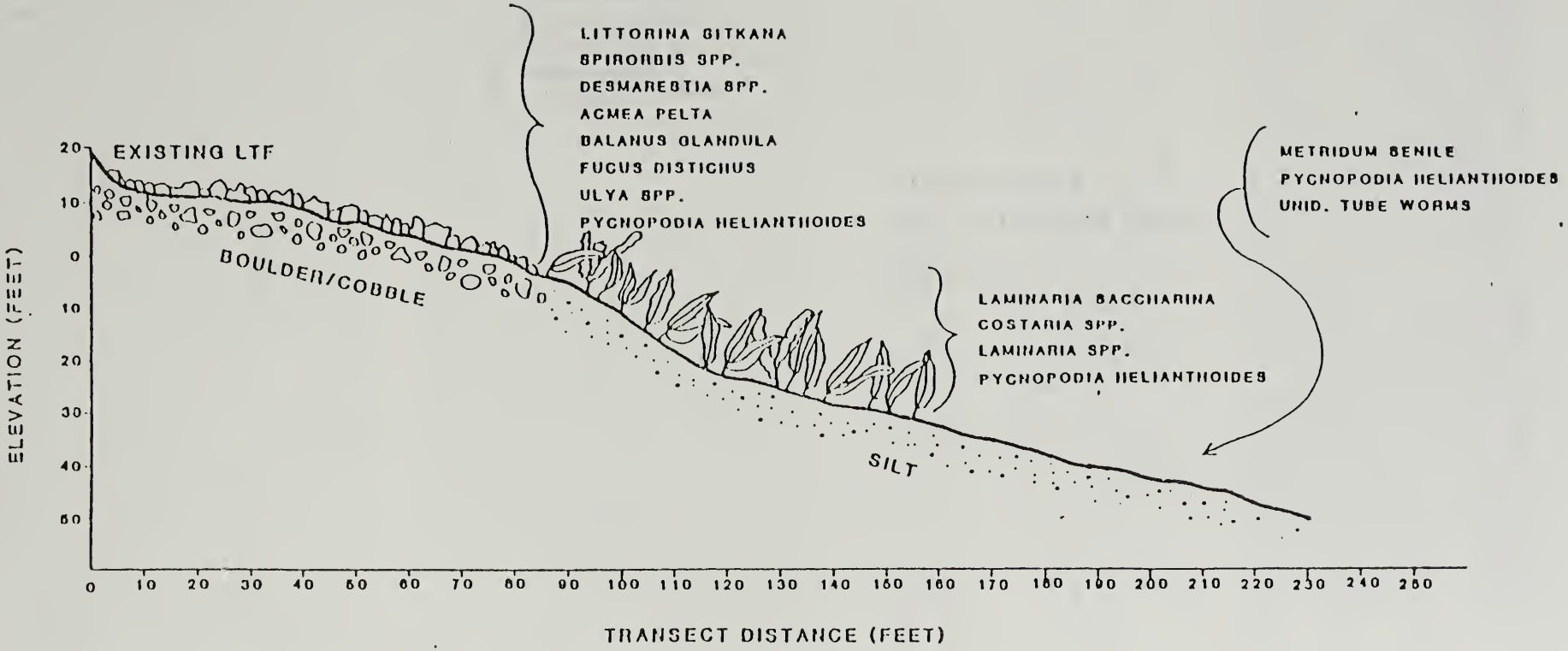
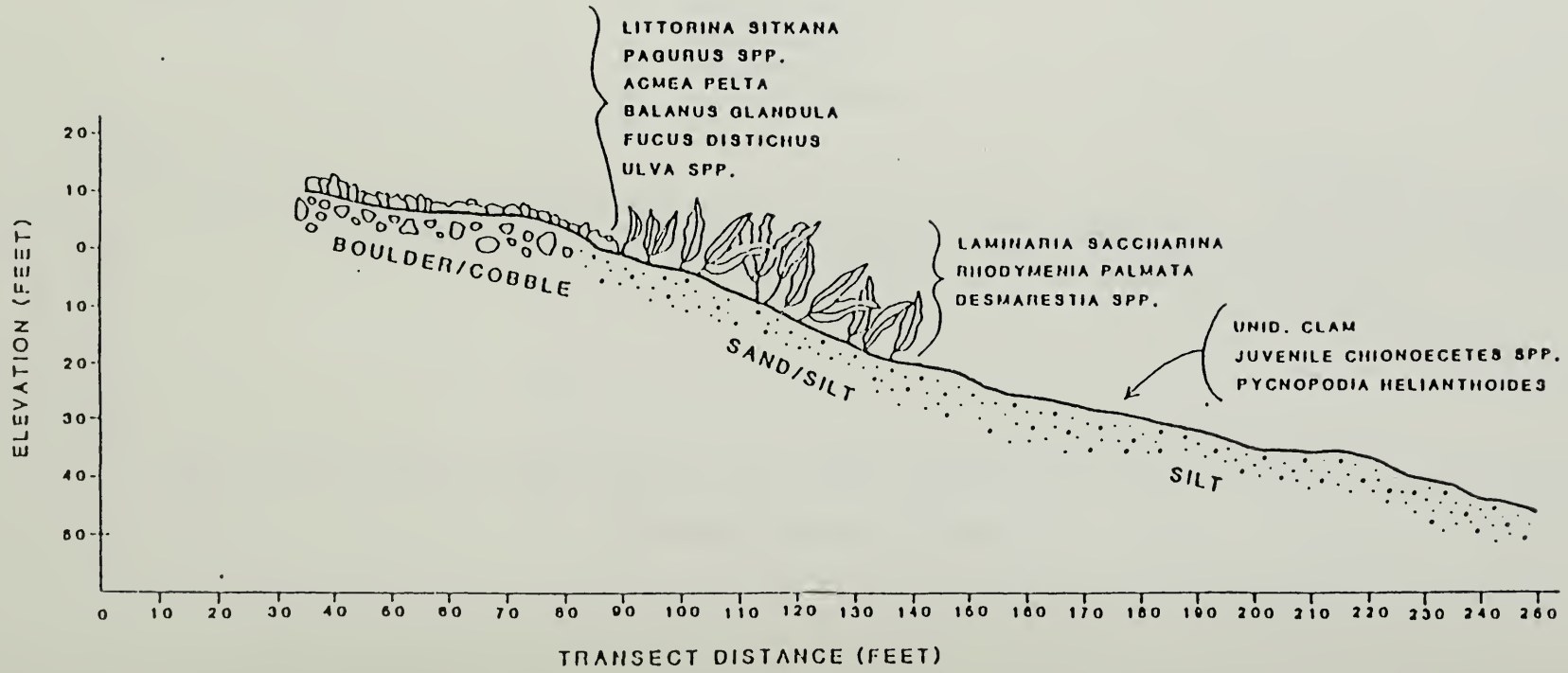


Figure 5.

LOG STORAGE AREA
NEAR SITE 5



criteria in their Log Transfer Facility Siting, Construction, Operation, and Monitoring/Reporting Guidelines of the Timber Task Force, October 21, 1985. These guidelines note that specific stipulations may be necessary for individual sites. However, a review of these guidelines is a logical "first cut" in the selection process. These guidelines also provide for construction and operational controls to reduce environmental impact. The state and federal agencies are particularly concerned with bark control, surface drainage, and monitoring efforts. Chugach should carefully review these criteria prior to final site selection.

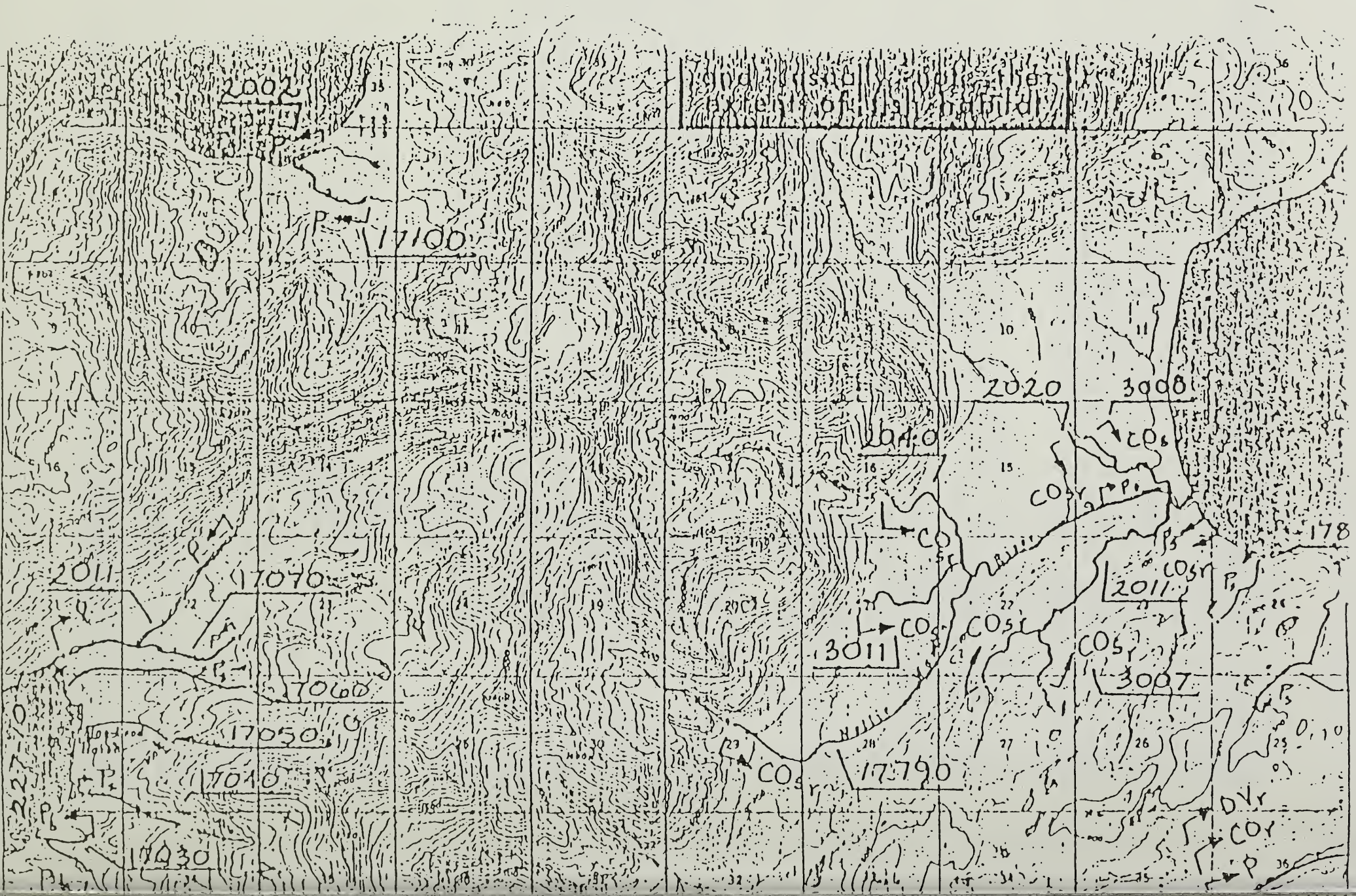
Use of the Task Force Guidelines indicates sites 1 and 2 are infeasible, primarily due to wind/wave exposure. They are farther than sites 3 and 4 from useable upland areas, and would conflict with existing commercial fish harvests near the mouth of MacLeod Harbor; hence, we recommend they be dropped from further consideration. The remaining sites are feasible.

Sites 3, 4, and 5 are all located near the mouths of pink salmon spawning streams (Figs. 6 and 7). Stream number 227-10-17020, near site 3, has less production than stream number 227-10-2011 near site 5.

The main biological advantage to site 3 or 4 is the paucity of macrobiota in the zone of immediate impact. Other advantages include large areas of adjacent uplands which would allow development of log storage/sort yard sites with perimeter drainage ditches and settling basins for water quality control. Disadvantages include the large amount of fill required to construct a bulkhead in adequate water depths and a relatively greater exposure to wind/wave action. This latter factor is important for safety/operational purposes. Currents on the south shore would tend to spread bark/wood debris over extensive areas of this broad, sloping beach. Erosion may be an additional problem. Local lodge personnel stated that the entire south shoreline of MacLeod Harbor is subject to significant shifting of substrate over short time periods.

Site 5 is the most protected (from wind/wave action) of all proposed sites. Adequate upland areas for storage/sort yards are available, and the distance to deep water is much less than all other sites. These factors are presumably the prime reasons site 5 was previously chosen for an LTF location. One disadvantage is that marine vegetation and associated fauna are more abundant here. However, considering the total area potentially affected by LTFs at each proposed site, and the previous use of site 5, the interagency team concludes this is the preferred site of those examined. Transfer methods which do not involve the placement of logs into the water are preferable to in-water methods. It is important to emphasize that preliminary investigations of the interagency team are restricted to relative comparisons of proposed sites only. Thus they cannot determine

Figure 6


2002
1700
2011
17070
17060
17050
17040
17030
2020
3008
3011
3007
17790
178

MOUNT KOUBE
227-10
Pt Digand
Peninsula
Pond Woodroom
Island
Montague
(BLYING SOUND D-1 AND D-2)

the (biologically) best of all possible sites for an LTF. Moreover, relative rankings necessarily change as sites are added or deleted.

Joint (U.S. Forest Service and Chugach Alaska Corporation) planning and use of an LTF for Montague Island is obviously prudent for all concerned entities. In the interest of minimizing total effects, the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service and National Marine Fisheries Service encourage continuation of such action and welcome the opportunity to participate as planning efforts proceed.

ROAD MANAGEMENT OBJECTIVES

The culmination of the planned access opportunities in each alternative is a set of proposed road projects for implementation based on a selection of alternative actions. Through the planning process, a management strategy was envisioned as the road proposals developed. This management strategy is called a Road Management Objective (RMO).

Road Management Objectives (RMOs) are written for each road planned for inclusion into the Forest's Forest Development Road (FDR) system. RMOs are approved by the District Ranger, but are included in the environmental statement as advisory information to the District Ranger. Our interested public would also be able to find out, in advance of construction, how the Forest Service intends to manage an individual road. Though the Forest Service is not a public roading agency, it is our goal to provide road access for multiple uses whenever it can be done safely for the user and the activity is not damaging to the environment or its eco-systems.

RMOs, once approved by the District Ranger, are the management guidelines for the District implementation and maintenance programs. As time goes by, conditions may change the management strategy for the road. The District Ranger can, at any time, approve changes or totally modify RMOs and is encouraged to periodically review the RMOs.

A proposed RMO for each road in the alternatives has been prepared. Each RMO, which follows, contains two sets of information which are described by their titles below.

1. Proposed Road Management Objectives

Here is where the management strategy is displayed. It deals specifically with road management intent and the individual resource management opportunities and constraints.

2. Proposed Road Design Standards

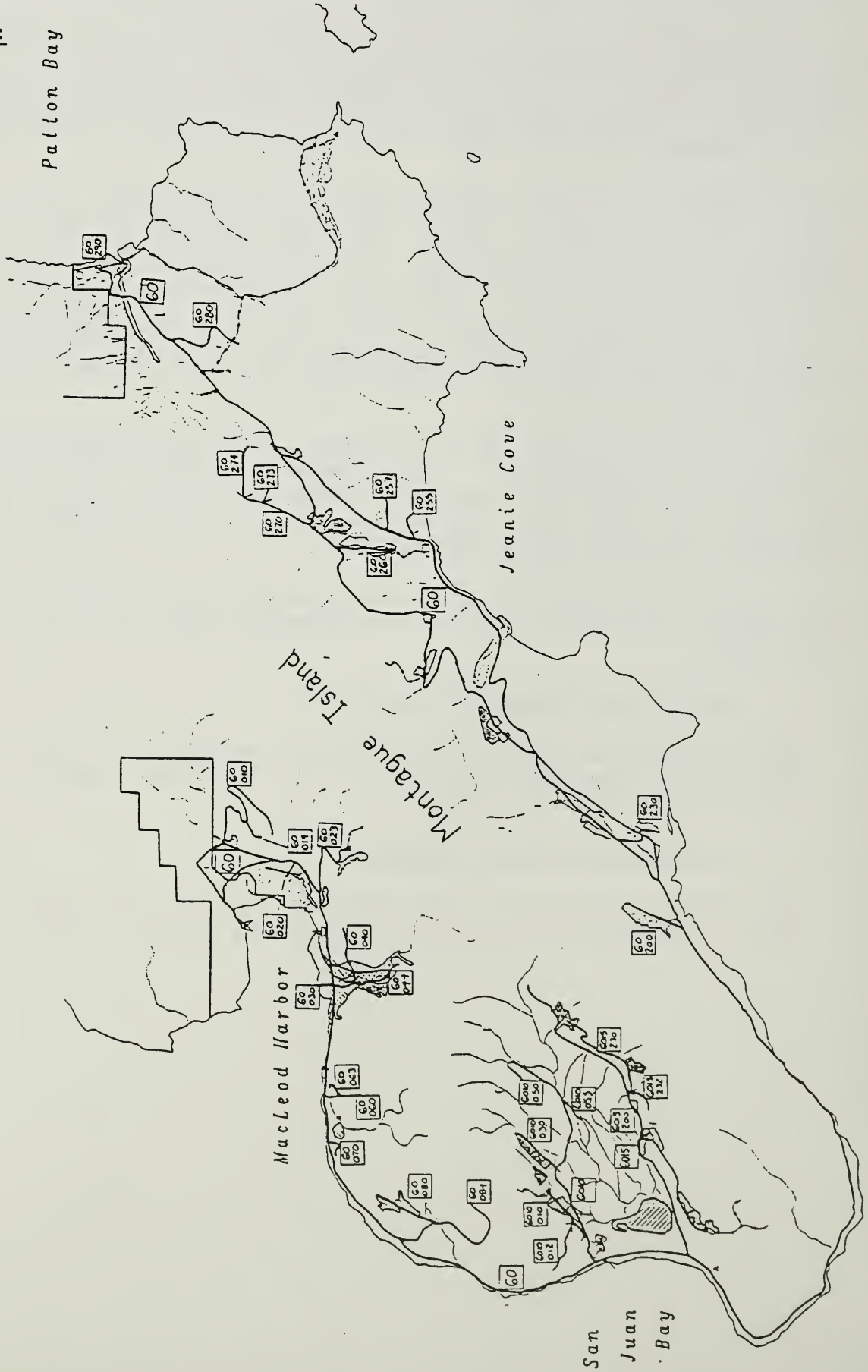
This records elements for the location, design, and construction of the road. The greatest use of this form would be for the design of a road.

DESCRIPTION OF ROAD LOCATION

ROAD LOCATION DIAGRAM

As planned:

~~As layed out~~:



Item	Tolerance Class[a]									
	A	B	C	D	E	F	G	H	I	J
Roadbed Width (Feet)	+0.5	+0.5	+1	+1	+1	+1	+1	+1.5	+1	+2
Subgrade Elevation (Feet)	±0.1	±0.2	±0.2	±0.5	±0.5	±1	±1	±1.5	±2	±3
Centerline Alignment (Feet)	0.2	0.2	0.5	0.5	1	1	1	1.5	2	3
Slopes, Excavation and Embankment (Percent Slope)[b]	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10

[a]Maximum allowable deviation from construction stakes and drawings.
[b]Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # 1610 NEW # 60 (Alt 2-6) FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Arterial	SURFACE	222	Aggregate
RESOURCE SYSTEM	14	Timber	LENGTH	224	35.6
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3,2,1	OBJ. MAINT. LEVEL	232	3

[XX] COST SHARE (Alt 4,5,6) [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial Cooperator [ ] DEPOSIT DEFERRED

ROAD PURPOSE [A][B][D]	TRAFFIC MANAGEMENT [E][ ][ ]	ROAD MAINTENANCE [A][D][ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E	E MONITOR 1-1 to 4-15	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function This route is a multi-functional route intended to provide access connecting areas separated by distance for resource management goals. Monitoring shall occur between Jan. 1 and April 15 and if large concentrations of deer occur, the entire road or sub-sections will be closed.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 60 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 35.6 FUNCTIONAL CLASSIFICATION Arterial FOREST Chugach NF

a. Design Speed 25 mph

b. Construction Tolerance D
(At Major Structures D)

c. Gradient: Max 8 % Min 0 %
Max Pitch 10 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 16 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 100 ft Width 10 ft
Transition Length 50 ft

g. Surfacing: Spot _____ Full _____
Depth ____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 100 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ____ ft Hor ____ ft

o. Turnaround: Yes ____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Ditch - 2 ft flat bottom

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # 1610 NEW # 60 (Alt 7) FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Arterial	SURFACE	222	Aggregate
RESOURCE SYSTEM	14	Timber	LENGTH	224	34.0
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3,2,1	OBJ. MAINT. LEVEL	232	

[ ] COST SHARE [XX] ROAD USE PERMIT Private Road [ ] COOP AGREEMENT

MAINTENANCE RESPONSIBILITY [ ] FS W/ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Permittee [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[D][A][ ]	[A][ ][ ]	[A][ ][ ]
A TIMBER HAUL - Private	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Short Term

MANAGEMENT INTENT - how it is to function This route is a road use permit access route for Chugach Alaska Corporation (CAC) between Patton Bay and MacLeod Harbor. The road will be closed to public access. Forest Service access will be administrative only for the permit. The road will be obliterated when the permit is terminated unless a resource need is determined and approved by a line officer. Expected 10 year use life period.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 60 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 34.0 FUNCTIONAL CLASSIFICATION Arterial FOREST Chugach NF

a. Design Speed _____ mph

b. Construction Tolerance _____
(At Major Structures _____)

c. Gradient: Max_____% Min_____%
Max Pitch _____% for _____ ft

d. Lanes: Single X Double_____

e. Travel Way Width_____ ft
Roadbed Width_____ ft

f. Turnouts: Max Spacing_____ ft
Length_____ ft Width_____ ft
Transition Length_____ ft

g. Surfacing: Spot_____ Full____
Depth____ in. Type_____
Comments_____

h. Curve Radius: Min Desired____ ft
Absolute Min Radius_____ ft

i. Curve Widening:
For Design Vehicle: Yes___ No___
For Critical Veh: Yes___ No___

j. Superelevation: Yes___ No___

k. Slough Widening: Yes___ No___

l. Slope Ratios: Fill_____:1
Cut in soil___:1; in rock ____:1
Other_____

m. Clearing Widths:
From Top of vert cut____ ft
From Top of other cuts____ ft
From Toe of Fill ____ ft

n. Clearances: Vert____ ft Hor____ ft

o. Turnaround: Yes____ No____
Type_____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Ditch - 2 ft flat bottom

q. Seeding & Mulching Req'm_____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation_____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # _____ NEW # 6010 FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Collector	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	1.0
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A] [B] [ ]	[E] [ ] [ ]	[A] [D] [ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E	E GATED AT E.O.P.	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function This route provides access along the north side of the San Juan drainage area for vegetation management and recreation. Constant access will be available, but the road is to be gated at the End of the Project (EOP) with the intersection of FDR 6010030.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 6010 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 1.0 FUNCTIONAL CLASSIFICATION Collector FOREST Chugach NF

a. Design Speed 15 mph

b. Construction Tolerance F
(At Major Structures D)

c. Gradient: Max 10 % Min 2 %
Max Pitch 15 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 50 ft

g. Surfacing: Spot _____ Full _____
Depth _____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 100 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ___ ft Hor ___ ft

o. Turnaround: Yes ___ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # _____ NEW # 6015 FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Collector	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	1.9
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A][B][ ]	[D][ ][ ]	[A][D][ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALL
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function This routes provides the access along the south side of San Juan Bay drainage area. This road provides access for vegetation management and development of hiking trails.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 6015 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 1.9 FUNCTIONAL CLASSIFICATION Collector FOREST Chugach NF

a. Design Speed 15 mph

b. Construction Tolerance F
(At Major Structures D)

c. Gradient: Max 10 % Min 2 %
Max Pitch 15 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 50 ft

g. Surfacing: Spot _____ Full _____
Depth _____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 100 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ____ ft Hor ____ ft

o. Turnaround: Yes ____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # _____ NEW # 6027 (Alt 6) FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Collector	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	0.3
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D2,1	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A][ ][ ]	[ ][ ][ ][ ]	[A][D][ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function This route provides access for vegetation management and dispersed recreation management.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 6027 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 0.3 FUNCTIONAL CLASSIFICATION Collector FOREST Chugach NF

a. Design Speed 15 mph

b. Construction Tolerance F
(At Major Structures D)

c. Gradient: Max 10 % Min 2 %
Max Pitch 15 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 50 ft

g. Surfacing: Spot _____ Full ____
Depth ____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 100 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ____ ft Hor ____ ft

o. Turnaround: Yes ____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID OLD # _____ NEW # 6000080 FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Local	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	1.5
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D2,1	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A][B][ ]	[D][ ][ ]	[A][D][ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck

SERVICE LIFE Long Term _ Constant to 0.6
Long Term - Intermit.to 1.5

MANAGEMENT INTENT - how it is to function This route provides access for vegetation management and dispersed recreation management to alpine region. Up to mile post (MP) 0.6 will be in constant service. Between MP 0.6 and EOP (MP 1.5) the road should be placed in storage during inactive periods of intermittent use.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 6000080 ROAD NAME _____ DISTRICT Cordova RD
LENGTH 1.5 FUNCTIONAL CLASSIFICATION Local FOREST Chugach NF

a. Design Speed 10 mph

b. Construction Tolerance I
(At Major Structures D)

c. Gradient: Max 12 % Min 2 %
Max Pitch 18 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 25 ft

g. Surfacing: Spot _____ Full _____
Depth _____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 80 ft

i. Curve Widening:
For Design Vehicle: Yes X No _____
For Critical Veh: Yes _____ No X

j. Superelevation: Yes _____ No X

k. Slough Widening: Yes X No _____

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert _____ ft Hor _____ ft

o. Turnaround: Yes _____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES

ROAD ID 6000020 - 0.2 mi. : 6000290 - 0.5 mi.

OLD # _____ NEW # * FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Local	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D2,1	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[B] [ ] [ ]	[D] [ ] [ ]	[A] [D] [ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALL
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according t R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Pick-up Truck w/trailer SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function This route provides access for recreation projects and activities.

PROPOSED ROAD DESIGN STANDARDS

6000020
ROAD NUMBER 6000290 ROAD NAME _____ DISTRICT Cordova RD
LENGTH _____ FUNCTIONAL CLASSIFICATION Local FOREST Chugach NF

a. Design Speed 10 mph

b. Construction Tolerance F
(At Major Structures D)

c. Gradient: Max 6 % Min 2 %
Max Pitch 10 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 25 ft

g. Surfacing: Spot _____ Full _____
Depth _____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 80 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ____ ft Hor ____ ft

o. Turnaround: Yes ____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES - 13 Roads

ROAD ID: 6000010 - 2.5 mi., 014 - 0.3, 040 - 1.0, 044 - 0.8, 060 - 0.5, 063 - 0.4, 070 - 0.4, 200 -0.4, 230 - 0.5, 255 - 0.5, 273 - 0.5; 6010050 - 1.6, 055 - 0.2.

OLD # _____ NEW # * FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Local	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3,2,1	OBJ. MAINT. LEVEL	232	1

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A] [ ] [ ]	[C] [ ] [ ]	[A] [ ] [ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALL
E	E	E

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according t R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams'
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Intermittent

MANAGEMENT INTENT - how it is to function This route provides access for the management of timber stands and the vegetative resource.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 13 rds ROAD NAME _____ DISTRICT Cordova RD
LENGTH _____ FUNCTIONAL CLASSIFICATION Local FOREST Chugach NF

a. Design Speed 10 mph

b. Construction Tolerance I
(At Major Structures D)

c. Gradient: Max 12 % Min 2 %
Max Pitch 18 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 25 ft

g. Surfacing: Spot _____ Full _____
Depth ____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 80 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ____ ft Hor ____ ft

o. Turnaround: Yes ____ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

PROPOSED ROAD MANAGEMENT OBJECTIVES - 14 Roads

ROAD ID: 6000023 - 1.3 mi., 030 - 0.2, 084 - 1.6, 257 - 0.5, 260 - 0.8, 270 - 1.0, 274 - 1.5, 280- 1.2; 6010010 - 0.7, 012 - 0.3, 030 - 1.3; 6015200 - 2.7, 230 - 1.6, 232 - 0.4

OLD # _____ NEW # * FY CONSTRUCTED 93

DISCRIPTION	COMPONENT (TIS)	ROUTE DATA	DESCRIPTION	COMPONENT (TIS)	MANAGEMENT SECTION DATA
SECTION	2	1	DISTRICT	206	Cordova
FUNCTIONAL CLASS	13	Local	SURFACE	222	Native Mat.
RESOURCE SYSTEM	14	Timber	LENGTH	224	
SYSTEM	17	FDR	JURISDICTION	229	USFS
QUAD	203	BS D3,2,1	OBJ. MAINT. LEVEL	232	2

[ ] COST SHARE [ ] ROAD USE PERMIT _____ [ ] COOP AGREEMENT _____

MAINTENANCE RESPONSIBILITY [X] FS W/ _____ FUNDS [ ] DEPOSIT RECURRENT

[X] USER Commercial [ ] DEPOSIT DEFERRED

ROAD PURPOSE	TRAFFIC MANAGEMENT	ROAD MAINTENANCE
[A][B][ ]	[D][ ][ ]	[A][D][ ]
A TIMBER HAUL	A ROAD CLOSED-PERMIT ACCESS	A RESOURCE PROTECTION ONLY
B RECREATION ACCESS	B CLOSED TO: TO	B BRUSH CLEARING
C ADMINISTRATIVE ACCESS	C CLOSED TO ALL TRAFFIC-INACT	C SURFACE BLADING
D PRIVATE LAND ACCESS	D UNRESTRICTED	D MAINTAIN DRAINAGE ANNUALLY
E _____	E _____	E _____

RESOURCE CONSIDERATIONS

Soils	
Water	
Fish/Wildlife	Culverts in Fish Streams shall be designed and installed according to R-10 "Roadway Drainage Guide for Installing Culverts in Fish Streams"
Visual/Recreation	
Cultural	Cultural surveys must be completed prior to any ground disturbing activity takes place.
Silvicultural	

DESIGN VEHICLE: Off-Highway Log Truck SERVICE LIFE Long Term - Constant

MANAGEMENT INTENT - how it is to function These routes provides access for the management of timber stands and the vegetative resource, plus recreation opportunitties during and post-sale periods.

PROPOSED ROAD DESIGN STANDARDS

ROAD NUMBER 14 rds ROAD NAME _____ DISTRICT Cordova RD
LENGTH _____ FUNCTIONAL CLASSIFICATION Local FOREST Chugach NF

a. Design Speed 10 mph

b. Construction Tolerance I
(At Major Structures D)

c. Gradient: Max 12 % Min 2 %
Max Pitch 18 % for 300 ft

d. Lanes: Single X Double _____

e. Travel Way Width 14 ft
Roadbed Width _____ ft

f. Turnouts: Max Spacing 1,000 ft
Length 50 ft Width 10 ft
Transition Length 25 ft

g. Surfacing: Spot _____ Full _____
Depth _____ in. Type _____
Comments _____

h. Curve Radius: Min Desired 100 ft
Absolute Min Radius 80 ft

i. Curve Widening:
For Design Vehicle: Yes X No ___
For Critical Veh: Yes ___ No X

j. Superelevation: Yes ___ No X

k. Slough Widening: Yes X No ___

l. Slope Ratios: Fill 1.25:1
Cut in soil 1:1; in rock 0.25:1
Other _____

m. Clearing Widths:
From Top of vert cut 10 ft
From Top of other cuts 10 ft
From Toe of Fill (s.) ft

n. Clearances: Vert ___ ft Hor ___ ft

o. Turnaround: Yes ___ No X
Type _____

p. Road Template: (Crown, outslope, inslope, ditches, dips)
Crown - 2%
Dtich - V shaped

q. Seeding & Mulching Req'm _____
Hydro-seed and mulch to be applied to all exposed mineral soil within clearing limits.

r. Drainage and Other Considerations
Bridges:
1) Pass 50 yr flood event
2) Not constrict channel flow

Culverts:
1) Pass 25 yr flood event
2) Pass fish in fish streams

s. Additional Documentation _____
Excess excavation and waste material disposal method to be specified in construction contract.

The Clearing Width from toe of fill will depend on the disposal method.

Appendix E
Fisheries Effects Analysis Process

FISHERIES EFFECTS ANALYSIS PROCESS

Introduction

Timber harvest can impact fish habitat by increasing stream sedimentation, altering water temperatures, reducing streambank and stream channel stability, and changing instream and streamside cover. The magnitude of these impacts are directly related to the individual harvest unit and road locations and designs, the management practices used to implement the project and the intensity of harvest within the watershed.

For the purpose of this analysis, fish habitat is defined as that portion of any stream that is classified as either a B,C,D, or E channel type. A complete description of these channel types can be obtained from the Supervisor's Office of the Chugach National Forest. These channel types produce all of the salmon and the vast majority of cutthroat trout and Dolly Varden char within the Big Islands Management Area. This method actually overestimates the amount of fish habitat available because several of the B channel types are actually too steep to support fish populations.

The A channel types are small headwater streams which are generally too steep to support significant populations of either anadromous or resident fish. These streams are assumed not to be fish habitat.

Because of their importance, the analysis specifically emphasizes impacts to anadromous habitat, including water quality impacts. Impacts to resident sportfish habitat are not analyzed seperately because, with the exception of isolated lakes, the majority of these populations are in the same stream systems as the anadromous fisheries and the impacts would be expected to be similar to those for anadromous habitat.

Ten parameters will be used to evaluate alternatives. They include: A) the relative importance of individual fish streams; B) the total miles of proposed harvest near streams; C) the miles of proposed harvest near streams within stream habitat zones (SHZ); D) the acres of proposed harvest within a watershed; E) the acres of proposed harvest within stream habitat zones (SHZ); F) the total miles of proposed road construction; G) the miles of proposed road construction within SHZ; H) the total number of proposed stream crossings; I) the number of proposed road crossings within SHZ; and J) a site-specific subjective rating of the potential for impacts to aquatic habitat for each harvest unit.

A. Relative Importance of Fish Streams

Each stream in the Big Islands Management Area is important in contributing to the cummulative wild stock salmon production, in maintaining stock diversity, and in supplementing production when individual streams have poor production because of variable biological or climatological factors. Several stream systems appear to be especially important because they produce a disproportionately high number of pink or chum salmon; because they provide exceptional sportfishing opportunities, or because they have

had fisheries habitat enhancement projects completed within the watershed.

To focus management attention on the most important stream systems, each fish stream within the management area is placed in one of three categories based on 1) the average pink and/or chum salmon escapements over a 20 year period, 2) the sportfishing potential of the system, 3) the presence or absence of fisheries enhancement projects, and 4) whether or not the stream was an ADF&G index stream.

Priority 1 streams (Very High Importance) within the Big Islands Management Area are shown in Table 1. They include all streams which meet one or more of the following criteria:

1. The stream provided an average of at least 1% of the estimated Prince William Sound wild stock production of pink and/ or chum salmon for either even or odd years between 1966 and 1987.

2. The stream provides significant sportfishing opportunities.

3. A large structural fisheries habitat improvement project has been developed within the stream system.

Priority 2 streams (High Importance) include all ADF&G index streams which are not designated as Priority 1 streams. Salmon escapement is annually monitored on index streams in Prince William Sound by ADF&G. Index streams provide the majority of the salmon produced. Priority 2 streams in the Big Islands Management area are shown in Table 2.

Priority 3 streams (Low-Moderate Importance) include cataloged anadromous fish streams which are not designated as either Priority 1 or Priority 2 streams as well as any streams which are suspected of having anadromous or high value resident fish habitat, but which are not yet documented.

To allow an evaluation of proposed management activities, this analysis displays the impacts for Priority 1,2 & 3 streams seperately. Much of the evaluation is based on cummulative totals for each group. Because of their importance, Priority 1 streams are evaluated individually to determine potential impacts to individual watersheds.

Table 1. Priority 1 Streams in the Big Islands Management Area.

Stream Name	Stream #	Selection criteria*	On Forest
Montague District (Montague and Green Islands)			
San Juan R.	17000	2	X
Quadra Cr.	17110	1	X
Swamp Cr.	17390	1	X
Chalmers R.	17410	2	X
Cabin Cr.	17470	1	X
Rocky Cr.	17590	3	X
Beach River	17780	2	X
Nellie Martin R.	17790	2	X
Stump Lake	17820	2	X
Southeastern District (Hawkins and Hinchinbrook Islands)			
Boswell R.	10050	3	X
Nuchek Cr.	18120	1	X
Constantine Cr.	18150	1	X
Shelter Bay Cr.	18210	2	X
Anderson Cr.	18280	1	X
Double Cr.	18310	1	X
Honker Cr.	18340	1	X
Cutoff Cr.	18350	1	X
Makaka Cr.	18440	2	X
Hawkins Cr	18470+18460	1	X
Canoe Pass Cr.	18520	3	X
Windy Cr.	18610	1	

* 1 = Provided at least 1% of Prince William Sound Pink and Chum wild stock production for either even or odd years between 1966 and 1987.

2 = Important sportfishing.

3 = Presence of large structural fisheries enhancement project.

Table 2. Priority 2 Streams in the Big Islands Management Area

Stream Name	Stream #	On Forest Land
Montague District		
Point Cr.	17020	X
Clam Beach Cr.	17030	X
MacLeod Cr.	17070	
Hanning Cr.	17100	X
---	17170	X
---	17180	X
---	17190	X
---	17220	X
---	17240	X
---	17250	X
Montegue Cr.	17260	X
Russel Cr.	17380	X
Kelez Cr.	17400	X
Wilby Cr.	17440	
Wild Cr.	17450	
Schman Cr.	17460	
Gilmour Cr.	17480	X
Shad Cr.	17490	X
Stockdale Cr.	17520	X
Dry Cr.	17540	X
Udall Cr.	17700	X
McKeran Cr.	17710	X
Rosswog Cr.	17740	X
Pautzke Cr.	17750	X
Green Cr.	17880	X
Southeast District		
---	18050	X
Etches Cr.	18060	
Beaver Cr.	18070	
Garden Cr.	18100	
---	18110	X
Deer Cr.	18170	X
Juania Cr.	18180	X
Eagle Cr.	18270	X
Bear Cr.	18290	X
Bates Cr.	18330	X
Dans Cr.	18360	X
Goose Cr.	18390	X
Rollins Cr.	18490	
Zillesenoff Cr.	18510	
West Lagoon Cr.	18560	
East Lagoon Cr.	18570	
North Lagoon Cr.	18580	
Clamdiggers Cr.	18620	

B. Miles of Timber Harvest Near Streams

Streamside timber stands stabilize the streambanks, moderate stream flows and temperature, provide inputs of large organic debris and organic nutrients, and support insects and other forms of fish food. Harvesting these stands may reduce streambank stability, increase stream flows during flood events, increase stream temperature during summer, decrease temperature during winter, increase sedimentation, and remove future sources of large woody debris.

The total miles of proposed timber harvest near all streams within the project area (including A channels) is an indication of the potential to reduce water quality on a watershed level for each of the alternatives. Because this parameter includes all streams, rather than just designated fish streams, this is not the best indicator of potential impact to fish habitat.

Big Islands Management Standards and Guidelines for timber harvest within riparian areas set minimium widths for Aquatic Habitat Management Units (AHMU) along all streams. The widths of the AHMU and the level of timber harvest allowed varies depending on the channel type of the stream (Appendix F). Actual harvest to the streambank will be rare. The total miles of harvest near streams displayed is equal to the sum of the miles of harvest near each side of the stream.

C. Miles of Timber Harvest Near Anadromous Fish Streams

The miles of proposed timber harvest near anadromous fish streams within the project area provides a better indication of relative potential to adversely impact fish habitat than the miles of proposed timber harvest near all streams.

D. Acres of Timber Harvest within a Watershed

The acres of proposed timber harvest within a watershed provides a relative index of the potential to impact water quality in the watershed. Because fish habitat is not distributed evenly throughout the watershed, this is not the most reliable indicator of impacts specifically to fish habitat.

E. Acres of Timber Harvest Within The Stream Habitat Zone

Within the project area, there are numerous small tributaries which contain anadromous fish habitat, but which have not been documented and cannot be identified on planning maps. These tributaries can support large populations of coho fry and are often more productive than the main stream. Because of their small size, they are also generally more susceptible to impacts from timber harvest.

Stream habitat zones (SHZ) were developed as an analysis tool to identify the general areas where there is a high likelihood of encountering anadromous habitat, including the small braided channels important to coho fry. The SHZ contains the main stem channels and lakes as well as the adjacent low gradient stream areas. The majority of the anadromous habitat is found within these zones, however, they may also contain areas with no

fish habitat. Potential adverse impacts to fish habitat are assumed to be proportional to the acres harvested with the SHZ.

SHZ were defined using a combination of stream channel type and landform information. They include all designated fish streams (all B,C,D, and E channel types and associated lakes) and adjacent landforms. Of the 23 landtypes which were used to describe landforms in the Big Islands area, 4 landtypes were used to develop the SHZ. These include: Alluvial Fans Landtype (81), Low Outwash Plains Landtype (82), Braided Streams Landtype (83), and High Outwash Plains Landtype (89). These four categories appeared to include the majority of the high quality freshwater fish habitat. Reports are available from the Supervisor's Office of the Chugach National Forest describing the various landtypes in the Management Area.

Stream Habitat Zones were created by combining all of the 81, 82, 83, and 89 landtypes adjacent to any B, C, D, or E channels or associated lakes. Where the designated landforms did not lie immediately adjacent, a 100 foot strip on each side of the stream and associated lakes was also included in the SHZ. The SHZ for many streams was simply the 100' strip on each side of the stream.

F. Total Miles of Forest Road Development

Forest road development and runoff from roads can introduce sediment into stream systems. If this sediment accumulates in a streamcourse it may reduce fish production by decreasing spawning success, eliminating rearing area, and altering the food base in the stream system. The magnitude of impacts from road development is correlated to road density and road use, but it also depends on a variety of factors such as stream gradient, stream size, runoff patterns, and construction techniques.

The total miles of road development is calculated for each alternative to give a relative indication of the potential impact which may occur throughout the project area.

G. Miles of Roading within the Stream Habitat Zone

The miles of road development proposed within the stream habitat zones provides a better representation of the potential impacts to fish habitat than total road development within the watershed.

H. Number of Stream Crossings

The adverse impacts of road development on fish habitat are related to the number of stream crossings and the resulting sedimentation.

I. Number of Stream Crossings within the Stream Habitat Zone

Stream crossings within the Stream Habitat Zone create the potential to adversely effect fish habitat because sediment is directly introduced into fish habitat. Unavoidable habitat losses also occur each time a culvert is placed into a fish stream.

J. Ratings of Individual Timber Harvest Units

To estimate site specific impacts on fish habitat, each harvest unit was rated on its potential to adversely affect fisheries resources. Ratings were assigned by District and Forest biologists, ranged from 0 (low) to 4 (high). The criteria for these rankings are included in Table 3.

Table 3.
Rating of Potential Adverse Effects of
Timber Harvest Units on Fish Habitat

SCALE	Effect	CRITERIA
0	None	-- No identified fish streams in unit -- The unit is not within the SHZ -- No expected impacts to fish habitat
1	Low	-- Minimal harvest near streamsides within unit -- Minor amount of harvest proposed within the SHZ -- No braided channels within unit, slide hazard areas or roads with major stream crossings
2	Low-Moderate	-- Moderate harvest near streamsides -- Moderate harvest in SHZ -- Some proposed harvest near both sides of minor streams
3	Moderate-High	-- High potential for impacts due to harvest near streamsides or within the SHZ -- Timber harvest near both sides of major streams -- Harvest near braided channels -- Many small rearing streams within unit -- The proposed unit would affect areas of unstable soils -- Very high fish habitat values within the unit -- High risk of impacting anadromous fish habitat -- High potential for long term impacts to fish habitat
4	High	-- Same criteria for 3 except for: -- Timber harvest activities would result in or contribute to the long term instability of fish habitat -- Standard mitigation measures are not feasible or would not adequately protect fish habitat -- Significant potential for long term impacts to fish habitat

Appendix F
Management Areawide Standards and Guidelines

RESOURCE: Cultural Resources

Activity: Cultural Resource Activities NAS Code: AC

I. General Direction - Project Clearance/Inventory

A. Project Clearance: Any project, activity, or program that can result in changes in the character or use of historic properties shall be considered an undertaking and would require evaluation through inventory and survey. The following procedures would be taken when implementing an undertaking to ensure close cultural resources coordination and monitoring throughout the compliance process.

Standards and Guidelines

1. No undertaking will proceed until consultation requirements have been completed and cultural resources clearance has been approved by the appropriate line officer.

2. Any undertaking that is not in compliance with 36 CFR 800 will be suspended until it is brought into compliance.

3. In each project area, prior to implementation, cultural resource sites will be marked for protection. Consult the Cultural Resource Handbook.

4. If a previously undiscovered site is found during the course of a project, the project administrator will halt any work that might potentially damage the site and immediately consult the State Historic Preservation Officer. Work may not resume until consultation has been completed.

5. Include in each contract, permit or lease a statement of the operating conditions required to protect cultural resources in or adjacent to the project area, and a clause addressing responsibility to protect sites and liability for damage.

6. Protect all cultural properties until a formal "Determination of Eligibility" for the National Register of Historic Places has been determined in consultation with the State Historic Preservation Officer.

B. Intensive survey is required for compliance ("project clearance"). Intensive inspection means systematic pedestrian examination of the surface, and subsurface examination where necessary to ensure that the goal of the survey ("project clearance") is accomplished.

Standards and Guidelines

1. All surveys should be guided by an explicit research design. If a research design is not used, the reason(s) should be documented in the survey report.

2. Cultural resource surveys will be designed, supervised, and evaluated by a professional archaeologist, anthropologist, or historian.

C. Projects that do not have the potential to affect cultural resources and are not under the direct or indirect jurisdiction of the Forest Service are not considered undertakings and may be excluded from survey; consult the Forest Archaeologist. In questionable cases, the Forest Archaeologist will recommend to the Forest Supervisor that the State Historic Preservation Officer be consulted. The following activities will not normally require intensive survey, unless known sites are involved:

Standards and Guidelines

1. Emergency actions taken to protect life or property are not considered undertakings subject to immediate consultation. Consult 36 CFR 78.

2. Activities that involve less than one square meter (11 square feet) of cumulative ground disturbance, unless in known sites.

3. Tenant-type maintenance of administrative sites, provided that such a site is not on or eligible for the National Register of Historic Places.

4. Activities taking place on glacial ice and permanent snowfields.

5. Non-discretionary, congressionally-mandated land exchanges.

6. Conveyances excuted under the authority of the Alaska Native Claims Settlement Act of 1971 (P.L. 920203) and the Alaska Statehood Act of 1958 (P.L. 85-508)

7. Activities where previous natural or human disturbance has modified the landscape so extensively that the likelihood of finding cultural resources is negligible (for example, vertical expansion of existing pits).

8. Maintenance, reconstruction, or replacement of existing facilities in areas which have already received archaeological clearance or which does not entail additional ground disturbance (for example, fish ladders, bridges, culverts, fences, cabins, or features of developed recreation sites).

9. Resource maintenance activities involving no surface disturbance sufficient to expose mineral soil (for example, TSI by hand or precommercial thinning by hand; associated campsites are excluded).

D. Inventory: Develop a comprehensive compilation of known cultural resources information in overview form which describes the location, description, status, and other management data for all project clearance and non-project surveys.

Standards and Guidelines

1. Include a compilation of areas that have been surveyed.

2. Include a discussion and map of areas assigned to the cultural resource sensitivity zones.

3. Include a discussion of the area's environmental and cultural histories.

4. Identify gaps in existing data and provide recommendations for future research.

5. Develop management direction.

6. Include a comprehensive bibliography.

7. Inventory of project specific areas would be completed during the planning process to ensure compliance with existing regulation.

8. Inventory standards are determined from direction contained within the FSM 2300, and formalized in a research design in consultation with the State Historic Preservation Officer.

9. Inventory the area of an undertaking's potential effect for cultural resources and of Native American religious use and traditional cultural significance.

10. Develop and maintain an inventory of sites identified by Native Americans to have religious or traditional significance in consultation with Native Americans.

E. Evaluate all cultural resources on National Forest lands. The following is the recommended order of priority.

Standards and Guidelines

1. Properties that may be adversely affected by proposed land management activities.

2. Properties undergoing deterioration due to vandalism, public use, erosion, or other forces.

3. Properties of known significance that have been identified but not previously evaluated.

4. Other cultural resource properties.

II. General Direction - Monitoring

A. Initiate a monitoring program that would document cultural site condition, interpretation potential, and restoration and stabilization needs.

Standards and Guidelines

1. Prioritize cultural sites to be monitored on a yearly basis as coordinated by the District Ranger, Forest Archaeologist, and Special Agent utilizing the same criteria as identified for evaluation.

   a. If site damage is observed additional inspections may become necessary. If an area is damaged through suspected human disturbance, other sites in that vicinity should also be inspected (consult the Forest Archaeologist and/or Special Agent).

2. Coordinate the monitoring plan with District Rangers, the Forest Archaeologist and the Special Agent.

B. Monitoring procedures would include observations documenting the current site condition. The monitoring of a site would be documented through a signed, written report that verifies which site was inspected and the observed condition.

RESOURCE: Recreation

Activity: Recreation Resource Planning NAS code: AN 112

I. General Direction - General Recreation

A. Increase and enhance a variety of recreation opportunities with an emphasis on making the management area more accessible and usable. Provide opportunities for both the highly qualified, outdoor enthusiast and the less well prepared or knowledgeable visitors.

B. The Recreation Opportunity Spectrum (ROS) describes the setting and experience expected for the entire management area and displays on the ground recreation objectives.

C. Recognize the significance of existing recreation uses such as hunting, fishing, beach combing, camping and boating. Maintain highly attractive recreation settings that continue these uses.

Standards and Guidelines

1. Develop a system of marine recreation areas that are compatible with the State's marine park system.

2. Improve access by constructing roads, trails, providing boating facilities and improving airstrips where practical.

3. Continue to allow aircraft and power boat use.

4. Length of stay at undeveloped sites would be limited to 14 nights.

5. Close areas to off-road vehicle travel to maintain high quality non-motorized recreation opportunities and eliminate impacts on sensitive ecosystems.

D. Recognize the need to provide new recreation opportunities and expand existing opportunities. Encourage the development of those activities that are consistent with natural resource based recreation. Expand opportunities for:

1. Freshwater fishing

2. Wildlife viewing and nature study

3. Hiking

4. Saltwater boating (kayaking, sailing, and power boating)

5. Interpretation of natural or cultural resources

6. Use of beaches and alpine areas

7. Loop travel routes (roads, trails, and water routes)

8. Motor vehicle travel and parking (on and off road use)

9. Camping (a spectrum of opportunities)

10. Back country biking

11. Winter uses beyond what currently exist, and

12. Other recreation activities that result from new technology or changes in recreation use patterns.

Standards and Guidelines

1. Develop a system of anchorages suitable for recreation boats which helps provide access to recreation attractions.

2. Provide other appropriate facilities to meet recreation needs (i.e. boating, camping, cabins, interpretive/information, hiking, parking, etc.).

3. Cooperate with affected communities, user groups and private or public partners when implementing scheduled recreation projects.

4. Locate and design recreation facilities to minimize the adverse effects on fish, wildlife, and other resources including visual resources. Consult the National Forest Landscape Management System, Volume 2, Chapters 1 (handbook 462) and 8 (handbook 666).

E. Increase the participation of private sector partners in the provision of recreation opportunities. Encourage all forms of partnerships that achieve the overall goals for the management area.

Standards and Guidelines

Identify activities where joint or cooperative development or management through partnerships is desirable.

F. Recreation opportunities provided on National Forest System land would be in concert with, and supplement, those opportunities which are located on lands of other ownership or jurisdiction. Generally, recreation areas, sites, and facilities located on National Forest lands should:

Standards and Guidelines

Complement, rather than duplicate, commercial public services (i.e. resorts, marinas, lodges, stores) within nearby communities or on private or other public land in the

vicinity. Needed public services are not being provided on private or other public lands, provide or encouraged.

G. Ensure that recreation opportunities are integrated into all resource programs.

Standards and Guidelines

1. During project planning for timber, fisheries and other resource activities consider public recreation needs including interpretive services.

Activity: Recreation Use Administration NAS code: AN 122

I. General Direction - Outfitter/Guide Operations

A. Encourage outfitter and guide operations which provide services that help customers use, enjoy, understand, and appreciate their National Forest.

B. Manage outfitter and guide operations as partnerships with the Forest Service.

C. Provide the public with information regarding outfitters, guides and other commercial services in brochures, maps, recreation opportunity guides and other media. Cooperate with permittees when developing public information and share costs when possible.

D. Administer outfitter and guide special use permits in accordance with the direction in FSM 2340 and 2720.

Standards and Guidelines

1. Outfitting and guide operations should not require permanent improvements occupying National Forest System lands.

2. Authorize outfitter/guide operations on the basis of the following criteria:

a. Balance guided and outfitted and general public use.

b. Ensure that the affected ecosystem(s) have the capability to accommodate the expected kinds of activities and amounts of use.

c. Ensure that there is a public need for the services to be offered and that the services would enhance the objectives of the Management Area.

d. Where competitive interest exists, issue a prospectus to solicit proposals. Select the proposal that provides the best public service.

e. Avoid adversely impacting other special use permit operations and popular or highly valued use areas.

f. Operations and activities must be appropriate for the specific recreation opportunity spectrum settings.

g. Operations must be carried out in a manner that is compatible with the existing or expected use by the general public and would not constitute de facto exclusive use areas.

h. Party size and distribution of groups should be appropriate for the activities and recreation setting. Generally consider maximum party size of 4 for primitive ROS settings, and 12 for semi-primitive settings. Larger group size may be authorized where it is desirable to have a higher guide/client ratio or where impacts on other user groups are not anticipated. There is no limitation on party size for other ROS settings.

i. Solicit advice from appropriate State agencies for operations that affect fish and wildlife populations. Utilize State licensing information if available when authorizing permits.

3. Provide outfitting and guide operations through the issuance of priority use permits whenever possible, supplemented with temporary permits. Assign priority use and temporary use permits based on the following criteria:

a. Normally, allocate approximately one-quarter of the total capacity of recreation use (in a specific area) to outfitter/guide operations. The limiting factor is that the outfitter/guide allocation should not result in defacto "exclusive use" areas.

b. Priority user permit would be assigned to outfitters that have demonstrated 3 years of satisfactory performance.

c. Prior to assigning priority use the total carrying capacity of the area should be established. Carrying capacity should be established for specific activities.

4. Include the following criteria when issuing permits that authorize tent platforms:

a. Platforms would not be located in sensitive visual zones or within 100 feet of active streams, rivers, lakes or beach front to insure aesthetics and quality recreational opportunities for other forest users.

b. Avoid locating at heads of bays, grass flats, and more attractive public use areas that are traditionally used or have a high potential for general public use.

d. Avoid locating immediately adjacent to salmon streams where human-bear confrontations may occur or in other important wildlife habitat areas.

e. All platform designs must be approved prior to construction.

f. Clean up bonds should be required to ensure sites are clean at the end of the use season unless previous performance indicates that a bond is not necessary.

g. Platforms would be removed for non-use periods of 30 days or more.

h. A letter of non-objection should be obtained if the proposed sites have been selected by Native corporations or the State of Alaska.

E. Enforce outfitter/guide permitting policies by monitoring and fully cooperating with State and local authorities and user organizations.

II. General Direction - Interpretive Services

A. Inform visitors of the various roles of the Federal, State, and private lands found in the area and the range of recreation and cultural interest opportunities and facilities available.

B. Provide visibility for the Forest Service mission and image at all Forest Service facilities.

III. General Direction - Recreation Settings

A. In locations where scheduled activities change the recreation setting, manage the new setting in accordance with appropriate ROS guidelines.

1. Maintain the capability of all areas to provide appropriate quality recreation opportunities on a sustained basis.

B. Manage recreation use and activities to meet the appropriate levels of social encounters, on-site development, and visitor impacts indicated for the associated ROS settings.

C. Manage recreation resource activities and facilities in accordance with the established Regional guidelines. All recreation planning and management activities would address the following critical elements of the recreation setting:

1. Visual Characteristics

2. Access

3. Remoteness

4. Visitor Management

5. On-Site Development

6. Social Encounters

7. Visitor Impacts

Activity: Trail Administration NAS Code: AT12

I. General Direction - Trail Administration and Maintenance

A. Construct, reconstruct and maintain trails and waterway facilities as part of the Forest transportation system. Consult Forest Service Handbook 2309.18, Trail Management Handbook and Standard Specifications for Construction of Trails, EM 7720-102.

Standards and Guidelines

1. Prioritize and schedule trail construction, reconstruction and maintenance to meet public needs as follows:

a. Existing trails and waterways serving local community needs, regional recreation needs and tourist centers.

b. Existing trails and waterways providing access to recreation facilities.

c. New trails and waterways which would serve local communities, regional recreation needs, tourist centers and resorts.

d. New trails which would disperse use and are needed to help protect resources from degradation.

B. Maintain trails to a level that meets the public need with an emphasis on safety and reducing resource damage.

DESCRIPTION OF ROS CLASSES

Rural recreation opportunities are usually within 1/2 mile of heavily traveled roads and/or waterways; or receive heavy aircraft travel. Provide access to recreation activity opportunities and facilities within the area. Adopted fvisual quality objectives do not exceed Maximum Modification, but are primarily Partial Retention or Modification in the foreground of sites and travel routes. Some facilities such as visitor centers may be elaborate and designed for large groups of people.

Roaded Natural recreation opportunities are usually within 1/2 mile of moderate to heavily traveled waterways and/or roads which are maintained to Levels 3 and 4 and open for use by the public; or receive heavy small aircraft travel or motorized boat use. Provide access to recreation activity opportunities and facilities within the area. Adopted visual management objectives do not exceed Modification, but are primarily Retention, and Partial Retention in the foreground of sites and travel routes.

Roaded Modified recreation opportunities are provided with appropriate facilities within cutover areas with a VQO of Maximum Modification; are accessed by Forest roads which are maintained to Levels 2, 3, and 4; are open for use by the public. Provide parking and camping facilities to enhance the use of recreation vehicles, fisherman parking, trailheads and ATV use of local nearby roads.

Semi-primitive Motorized recreation opportunities are usually available within 1/2 mile of infrequently travelled waterways, or small aircraft access points; and/or roads which are maintained for passage by high clearance and four-wheeled drive vehicles (Maintenance Level 2), open to public use, and provide access to appropriate recreation opportunities and facilities. Manage such areas to provide for low to moderate numbers of encounters with other parties and appropriate solitude at campsites.

Semi-primitive Nonmotorized recreation opportunities are usually available in all areas more than 1/2 mile away from infrequently travelled waterways, or roads and trails open to motorized recreation use, and clearcut areas. Aircraft access is only occasional.

Primitive (formerly PII) recreation opportunities are usually available in all areas that meet the remoteness criteria for the Primitive ROS setting.

Pristine (formerly PI) recreation opportunities are provided in selected areas that meet the remoteness criteria for the Primitive ROS setting, and provide essentially unaltered wildland ecosystems, and have non-motorized access.

Use the following ROS charts in project planning and analysis as guidelines to establish appropriate levels of use, scale and kinds of facilities, visual quality objectives, types of access and services to meet local and Regional needs and desired recreation setting conditions.

LEGEND FOR ROS SETTING INDICATORS CHARTS

FULLY COMPATIBLE - Conditions that meet or exceed the norm.
NORM ---------- Normal conditions found in the setting.
UNACCEPTABLE ----- Unacceptable conditions under any circumstances for a given setting.

FACILITY DEVELOPMENT SCALE

1. Minimum site modification. Rustic/rudimentary improvements for site protection only.
2. Little site modification. Rustic/rudimentary improvements for site protection and some comfort for user. On-land motorized access with some traffic controls.
3. Moderate site modification. Facilities equally for resource protection and user comfort.
   Contemporary/rustic design of facilities.
   Interpretive services often informal, but on-site.
4. Site heavily modified. Some facilities strictly for user comfort and convenience of user. Roads hard surfaced with obvious traffic controls. High density units/acre.
5. High degree of site modification. Facilities mostly designed for comfort and convenience of user. Flush toilets and electrical hook-ups common. Synthetic materials often used. Formal, sophisticated interpretive facilities available. Site often landscaped with exotic materials.

PARTY SIZE

Typical independent party consists of 3-4 people traveling as a social group. Guided or organization groups are typically larger.

SITE HARDENING

Site hardening (such as paving, extensive barrier work, etc.) is done to reduce visitor impacts.

ROS CLASS
RURAL

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed Modification in the foreground and Maximum Modification in middle ground as seen from Sensitivity Level I travel routes	Unacceptable Modification (VQM hdbk.) in foreground or middle ground
Access	All forms of access and travel modes may occur within the Management Area or designated ROS zone	Lack of Traffic control facilities and signing
Remoteness	Remoteness is of little importance, and moderate to high concentrations of people and sights and sounds of human activity are acceptable when not of a continuous nature.	Continuous high levels of use or human caused sounds
Visitor Management	On-site regimentation and controls are obvious. Control facilities harmonize with natural/exotic landscaping. Information facilities may be complex and dominant on developed sites.	Use of inappropriate or hostile traffic control structures or signs
On-site Development	All development levels are appropriate and maintained at intended standards necessary to accommodate the types and levels and use anticipated for the site and area	Sites which are allowed to deteriorate to unsafe or unsightly condition

ROS CLASS
RURAL
(continued)

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User may meet more than 20 other parties per day on trails and in dispersed areas. Developed sites often are at full capacity, but do not exceed 20% of the design capacity more than one half the season of operation.	Site and/or area capacities exceeded more than 20% for more than half the season
Visitor Impacts	Visitor caused impacts noticeable, but not degrading to basic resource elements or exceed established visual quality objectives. Site hardening may be dominate, but is in harmony with natural/exotic landscape and appropriate for the site and setting.	

1/ Setting Conditions represent R-10 Standards and ANILCA provisions.

ROS CLASS
ROADED NATURAL

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective of Modification. Existing visual conditions ranging from Preservation through Partial Retention (EV I through III)are fully compatible and encouraged.	Existing visual condition of Maximum Modification
Access	All forms of access and travel modes may occur within the Management Area or designated ROS zone which are compatible with intended activities. Zone of non-motorized use may be established for resource protection & user safety/comfort	Lack of Traffic control facilities and signing
Remoteness	Remoteness of little importance, but low to moderate concentrations of human sights and sounds are preferred.	Continuous high levels of human use and/or sounds
Visitor Management	On-site regimentation and controls are obvious. Control facilities harmonize with the natural environment. Visitor information facilities are not elaborate or complex.	Highly sophisticated visitor information facilities. Use of military-type control structures
On-site Development	Facilities and structures generally do not exceed Level IV standards and are maintained at intended standards necessary to accommodate the types and levels of use anticipated for the site and area.	Sites which exceed Level IV

ROS CLASS
ROADED NATURAL
(continued)

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User meets less than 20 other parties per day on trails and dispersed areas. Developed sites often are at full capacity but do not exceed 20% of the design capacity more than one half the season of operation.	Site and/or area capacities exceeded 1/2 the operating season.
Visitor Impacts	Visitor caused impacts noticeable, but not degrading to basic resource elements or exceed established visual quality objectives. Site hardening may be dominate, but is in harmony with natural appearing landscape and appropriate for the site and setting.	

1/ Setting Conditions represent R-10 Standards and ANILCA provisions.

ROS CLASS
ROADED MODIFIED

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective of Maximum Modification. Apply appropriate visual management techniques in the foreground of sensitive travel routes and recreation sites to soften the effects of the maximum modification conditions.	Unacceptable Modification existing visual condition anywhere
Access	All forms of access and travel modes may occur within the designated ROS zone which are compatible with intended activities. ORV use on designated routes or areas is encouraged.	Dominating Traffic control facilities and signing
Remoteness	Remoteness from urban conditions and high concentrations of people is important. Low concentrations of human sights and sounds in a back-country roaded setting is preferred.	Continuous high levels of people or human caused sounds
Visitor Management	On-site regimentation and controls are few. Control facilities are appropriate for the predominating back-country roaded setting. Visitor information facilities may be used to interpret management activities, but are not elaborate and are appropriate for the setting.	Highly sophisticated visitor information facilities. Use of military-type control structures
On-site Development	Facilities and structures generally do not exceed Level II standards and are maintained at intended standards necessary to accommodate the types and levels of use anticipated for the site and area.	Sites which are allowed to deteriorate to unsafe or unslightly condition.

ROS CLASS
ROADED MODIFIED
(continued)

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User meets less than 10 other parties per day on trails and dispersed roaded areas. Few, if any, other parties are visible at dispersed campsites.	Developed site capacities are exceeded more than half the use season
Visitor Impacts	Visitor caused impacts noticeable, but not degrading to basic resource elements. Site hardening may be dominate at campsites and parking areas, but is in harmony with, and appropriate for back-country roaded setting.	

1/ Setting Conditions represent R-10 Standards and ANILCA provisions.

ROS CLASS
SEMI-PRIMITIVE MOTORIZED

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective of Partial Retention. Existing visual conditions ranging from Preservation through Retention (EVC I and II) are fully compatible and encouraged.	Any visual condition which exceeds Partial Retention of the characteristic landscape
Access	Travel on motorized trails and TSL 4 roads. Less than 20% of the road mileage within the Management Area or designated ROS zone is TSL 3. Road density is less than one mile per square mile within the Mgmt. Area or zone. Off road snowmachine travel on snow may occur.	> 20% total area road mileage is TSL 3. > 1 mile/sq. mi. road density.
Remoteness	Nearby sights or sound of human activity is rare, but distant sights or sounds may occur. Setting is located more than 1/2 hour walk or paddle from TSL 3 roads or other high use travel routes. Perception of remoteness is moderate.	Continuous high levels of people or human caused sounds and travel.
Visitor Management	On-site regimentation and controls are few. Control facilities are appropriate for the predominating natural appearing setting. Visitor information facilities may be used to interpret cultural and natural resource features, but are not elaborate and harmonize with the setting.	Obvious & inappropriate controls & regimentation Sophisticated information facilities
On-site Development	Facilities and structures generally do not exceed Level II standards and are maintained at intended standards necessary to accommodate the types and levels of use anticipated for the site and area.	Development Level IV or V sites & facilities

ROS CLASS
SEMI-PRIMITIVE MOTORIZED
(continued)

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User meets less than 6-10 parties per day on trails and roads. No other parties are within sight or sound of dispersed campsites. 1-3 other parties within sight or sound of campsites is acceptable only during peak season use.	Meet > 10 parties/day during trip. >3 other parties at campsites.
Visitor Impacts	Visitor caused impacts may be noticeable, but not degrading to basic resource elements. Limited site hardening may be used for resource protection, but is in harmony with, and appropriate for the natural appearing back-country setting.	Visitor caused impacts and/or site hardening which dominate the setting

1/ Setting Conditions represent R-10 Standards and ANILCA provisions.

ROS CLASS
SEMI-PRIMITIVE NON-MOTORIZED

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective of Retention. An existing visual condition of Preservation (EVC I) is fully compatible and encouraged.	Any visual condition which exceeds Retention of the characteristic landscape.
Access	Cross-country travel and travel on non-motorized trails within the designated ROS zone. Use of airplanes, helicopters, motorboats and snowmachines for traditional activities, subsistence, emergency search and rescue, and authorized administrative activities may occur unless specifically restricted for safety and/or resource protection purposes.	Other motorized travel within the ROS zone is infrequent
Remoteness	Nearby sights and sounds of human activity is rare, but distant sights or sounds may occur. Setting is located more than 1/2 hour walk or paddle from any road open to public travel (Not including marine travelways).	Nearby sight or sound of human activity. No perception of remoteness.
Visitor Management	On-site regimentation and controls are few. Control facilities are appropriate for the predominating natural appearing setting. Visitor information facilities may be used to interpret cultural and natural resource features, but are not elaborate and harmonize with the setting.	Obvious & numerous controls & regimentation Sophisticated information facilities
On-site Development	Facilities and structures generally do not exceed Level II standards and are maintained to accommodate the types and levels of use anticipated for the site. Recreation cabins are fully compatible.	Development Level IV or V sites and facilities

ROS CLASS
SEMI-PRIMITIVE NON-MOTORIZED
(continued)

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User meets less than 6-10 parties per day on trails and streams. No other parties are within sight or sound of dispersed campsites. 1-3 other parties within sight or sound of campsites is acceptable only during peak season use.	Meet >10 parties/day during trip. >3 other parties at campsites.
Visitor Impacts	User caused impacts to resources are moderate and usually not long-lasting. Site hardening is limited to boardwalk trails, boat tramways, moorings and docks and bearproof food cache facilities.	Long-lasting User impacts Dominate site hardening

1/ Setting Conditions represent R-10 and ANILCA provisions.

ROS CLASS
PRIMITIVE

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective Retention. An existing visual condition of Preservation (EVC I) is fully compatible and encouraged to be maintained.	Any visual condition that exceeds Retention of the characteristic landscape.
Access	Cross-country travel and travel on non-motorized trails within the Management Area or designated ROS zone. Use of airplanes, helicopters, motorboats and snowmachines for traditional activities, subsistence, emergency search and rescue, and authorized administrative activities may occur unless specifically restricted for safety and/or resource protection purposes.	All other motorized travel with in the area or zone.
Remoteness	No or infrequent sights and sounds of human activity is present. Setting is located more than 1.5 hours walking or paddling distances from any human developments other than marine travelways.	Frequent near or distant sight/sound of human activity. >1.5 hr. walk/paddle from developments. No perception of remoteness
Visitor Management	On-site regimentation and controls are very rare. Signing is limited to directional information and safety needs. No on-site interpretive facilities are used and there is great opportunity for discovery on the part of the user.	Noticeable on-site regimentation and controls. Excessive on-site information and interpretation.
On-site Development 2/	Structures do not exceed Level I standards except for recreation cabins, and are maintained for appropriate levels of use.	Any site or facility > Level I

ROS CLASS
PRIMITIVE

Setting Conditions 1/

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	User meets less than 1-3 parties per day during trip. No other parties are within sight or sound of dispersed campsites or cabins.	Meet 4 or more parties per day. Other parties visible at campsites.
Visitor Impacts	User caused impacts to resources are slight and usually not noticeable the following year.	User impacts are noticeable or site harding is inappropriate.

1/ Setting Conditions represent R-10 Standards and ANILCA provisions.

2/ Authorized recreation cabins are considered compatible.

ROS CLASS
PRISTINE

Setting Conditions

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Visual Quality of Non-recreation Activities	Not to exceed a visual quality objective Retention. An existing visual conditon of Preservation (EVC I) is fully compatible and encouraged to be maintained.	Any other visual condition
Access	Cross-country travel on non-motorized trails. Infrequent nonmechanized subsistence use	All motorized access, including airplanes, helicopters and boats.
Remoteness	User is out of sight and sound of human activity. More than 1.5 hours travel by walking or paddling from human developments.	Near or distant sight or sound of human activity. man activity. <1.5 hour walk/paddle from road. No perception of remoteness
Visitor Management	Low regimentation. No on-site controls or information facilities.	Noticeable on-site regimentation and controls. On-site information or interpretation facilities.
On-Site Development	No development sites	Any site or facility > Level I

ROS CLASS
PRISTINE

Setting Conditions

Setting Indicators	NORM/FULLY COMPATIBLE	UNACCEPTABLE
Social Encounters	Meet < one party/day during trip. No other parties visible at campsites.	Meet 4 or more other parties per day. Other parties visible at campsites.
Visitor Impacts	Unnoticeable impacts caused by user. No site hardening (i.e., boardwalk trails, etc.).	User impacts are noticeable

RESOURCE: VISUAL

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Adopted Visual Quality Objectives (VQO's) provide direction in managing all land areas and coincide with the goals, direction and objectives of the management area.

B. Adopted Visual Quality Objectives would be met to the greatest extent possible. Unless amended by the appropriate environmental analysis.

C. Detailed landscape analysis is recommended for all development activities and is required for all activities within viewsheds seen from sensitivity level 1 and 2 travel routes and areas. Consult the National Forest Landscape Management Handbook series and R10 Forest Service Handbook 2309 for guidance. Chapter 1, The Visual Management System; Chapter 4, Roads; and Chapter 5, Timber, have the greatest application to the management activities proposed herein.

D. Complete viewshed analyses in conjunction with project level planning. Priority for viewshed analysis is as follows: 1) Scenic Viewshed Prescription Areas, 2) other sensitivity level 1 areas or portions thereof, 3) other visually sensitive viewsheds identified in the planning period.

Standards and Guidelines

1. Consult National Forest Landscape Management Handbooks for guidance.

2. Involve needed resource disciplines in the analysis process.

Activity: Visual Resource Preparation NAS Code: AV11

I. General Direction

Provides for the inventorying, planning, coordinating and preparing for management activities within each Visual Quality Objective setting. (See VQO maps)

A. VQO Preservation

Allow ecological changes only, with the objective to achieve or maintain a pristine environment.

Standards and Guidelines

Facilities: Very low impact recreation facilities and management activities are allowed (includes: trails and small, minor signs, minimal impact fish & wildlife projects, etc.).

B. VQO Retention

Design and locate management activities so that they are not visually evident to the casual observer.

Standards and Guidelines

1. Facilities

a. Coloring of structures should closely correlate to natural conditions.

b. Clearing of vegetation adjacent to the site should be kept to a minimum.

c. Select materials that blend with the natural surroundings.

d. Locate facilities in such a way as to minimize their visibility from sensitive viewpoints.

e. Forms and lines of structures should blend with natural landscape patterns and features.

f. Re-establish vegetation cover immediately after project work is completed.

2. Transportation

a. Rock or Borrow Sources

i. As much as possible, select locations that are not visible from sensitive viewpoints.

ii. Borrow sources should not be located within harvest units visible from sensitive viewpoints.

b. Corridor Treatment

Provide for roadside cleanup of ground disturbing activities.

c. Log Transfer Facilities (LTF's)

Generally are not appropriate in this VQO setting.

d. Road Design and Construction

i. Where feasible, try to revegetate temporary roads within one full growing season following road closure.

ii. In areas visible from sensitivity level 1 & 2 viewpoints, slash will be treated to conform to natural terrain.

iii. Roadside clearing should be kept to a minimum. Undulate or feather clearing boundaries where appropriate to better blend the clearing limits with natural vegetative patterns.

iv. All cut and fill slopes should be rehabilitated as a part of the road construction.

v. Standard Forest Service signs should be provided at significant natural features such as stream crossing to help visitors orient themselves.

3. Vegetative Management

Manage existing vegetation within immediate foreground areas of the arterial road, recreation sites, and other public use sites so that management activities are not visually evident.

a. Layout timber harvest units by using feathering techniques along unit boundaries.

b. As deemed necessary, the Forest landscape architect should review unit layout in the foreground areas of the arterial MOntague Island road and other sensitivity levels 1&2.

c. During unit layout try to use vegetative buffers or islands, to limit the size of openings.

d. Stump heights should be 12" or less within 150' of road and stump cuts should be angled away from the viewpoints. Sensitive travel routes or viewpoints.

e. Slash should be removed within 150' of the edge of the traveled way. Within the next 50' slash shall lie within 2' of the ground.

f. To the extent feasible, locate log decks and landings out of sight of views from sensitive viewpoints and travel routes.

4. If project monitoring indicates a need for visual rehabilitation measures, a rehabilitation plan would be developed in an interdisciplinary setting.

C. VQO Partial Retention

Design and locate activities to be subordinate to the landscape character of the area. This VQO should be accomplished within one year of project completion.

Standards and Guidelines

1. Facilities

   a. Maintain or enhance views both to and from the facility.

   b. Use colors and materials found in the natural environment or that blend with the natural surroundings.

2. Transportation

   a. Design rock sources to not be seen from sensitive travel routes. Rehabilitation plans would be necessary following closure of the pit.

   b. LTF

      Develop rehabilitation plan at the close of contract on LTF life.

   c. Road Design and Construction

      i. Revegetate nonsystem roads within one season of closure.

      ii. In areas visible from sensitivity level 1 and 2 viewpoints, slash treatment should be such that there should be no noticeable slash and a treated area that conforms to natural terraine vegetative patterns.

ivv. Roadside clearing should be kept to a minimum. Undulate or feather clearing boundaries where appropriate to better blend the clearing limits with natural vegetative patterns.

iv. All cut and fill slopes should be rehabilitated as a part of the road construction.

v. Standard Forest Service signs should be provided at significant natural features such as stream crossing to help visitors orient themselves.

3. Vegetative Management

Manage vegetation within Partial Retention viewsheds so that management activities are not visually dominant when seen from sensitive viewpoints.

a. Layout timber harvest units using feathering techniques along unit boundaries.

b. The Forest landscape architect should review unit layout within foreground areas of sensitivity level 1 and 2 viewpoints.

c. During unit layout try to use vegetative buffers or islands, undulated edges or topographic screening to limit the size of openings.

d. Within 100 feet of sensitive travel routes or viewpoints slash shall lie within 2' of the ground after treatment.

e. To the extent feasible, locate log decks and landings out of sight of views from sensitive viewpoints and travel routes.

4. If project monitoring indicates a need for visual rehabilitation measures, a rehabilitation plan would be developed in an interdisciplinary setting.

D. VQO Modification

Activities may visually dominate the original characteristic landscape. Activities and facilities should borrow from natural forms, lines, colors and textures so that their visual characteristics are compatible with the natural surroundings. This VQO should be met within one year of project completion.

1. Vegetative Management

Vegetative management within modification viewsheds may dominatethelandscape but should borrow visual characteristics from the natural landscape.

a. Lay out timber harvest units within the foreground of sensitive viewpoints to create openings that are consistent with the natural vegetative and topographic patterns. Unit shapes and edges should borrow from natural features as much as possible.

b. Slash should lie within 2' of the ground within 100' of sensitive viewpoints.

E. VQO Maximum Modification

Area may be dominated by management activities.

Standards and Guidelines

Design activities to resemble natural occurances as viewed in the background distance zone.

F. Update visual resource inventories as project implementation changes sensitivity levels, seen areas (due to new roads, trails, cabins or other recreation use areas) and use patterns. Revise inventoried VQO's as appropriate to reflect these changes. Use the revised inventoried VQO's to guide consideration of revision of adopted VQO's through Forest Plan amendment or revision.

Activity: Visual Resource Administration NAS Code: AV12

I. General Direction

Provides for rehabilitation, mitigation, enhancement and monitoring of the visual resource.

A. Minimize potential visual impacts through scheduling design and/or timing management activities. This is covered under AV11.

B. Rehabilitate, where practicable, existing projects and areas which do not meet the Adopted Visual Quality Objectives. Consider the following in setting priorities:

1. Relative importance of the area (public sensitivity).

2. Projected length of time to naturally attain the Adopted VQO in comparison to the cost and effectiveness of rehabilitation techniques.

3. Benefits to other resources by accomplishing rehabilitation.

C. Use enhancement measures, where practicable, to achieve the desired visual character for an area when that desired visual character has been defined as something different that the existing situation.

D. 1. Prioritize enhancement activities based on existing character differs from a defined desired landscape character.

E. Monitor changes in the visual resources: Consult the Landscape Management Handbook, Region 10, chapter concerning monitoring.

Standards and Guidelines

1. Monitor the effect of natural and managed visual resource rehabilitation upon existing landscape alterations.

2. Based upon the above monitoring activities, update maps and tables tracking the number of acres in each visual condition class.

3. Areas not in compliance with VQO's would be identified through a comparison of updated visual condition data to the adopted VQO's. Evaluate and prioritize those areas relative to their potential as visual rehabilitation projects.

RESOURCE: Fish

Activity: Fish Habitat Inventory NAS Code: CF111

I. General Direction

A. Develop and maintain a channel type and stream class (see glossary) based inventory of all streams within the management area.

Standards and Guidelines

1. Identify the channel type and stream class of all streams which are adjacent to proposed land disturbing activities prior to final project design and layout. Concentrate on those portions of the streams which have the potential to be impacted by the proposed activity.

2. Initiate a channel type and stream class inventory for all streams within the management area, prior to the next Forest Plan revision. Consult publication R10-MB-6, the "Channel Types Field Guide," (as revised) for descriptions of the channel types.

3. Maintain and update the channel type and stream class inventory during site specific project planning.

B. Gather adequate information to develop and verify the Management Indicator Species (MIS) habitat capability models prior to revision of the Forest Plan.

Standards and Guidelines

1. Initiate surveys and inventories to identify population levels, habitat use patterns, and potential limiting factors for MIS within the management area.

2. Inventories should be correlated with channel type classifications.

Activity: Fish Habitat Planning NAS Code: CF112

I. General Direction

A. Favor the protection or enhancement of natural fish habitat over mitigation or rehabilitation.

B. Use Management Indicator Species to evaluate the effects of management activities on fish.

II. General Direction - Management of Aquatic Habitat Management Units

Stream and lakeside Aquatic Habitat Management Units (AHMU) will be managed to maintain or improve habitat for fish and other riparian dependent species.

Standards and Guidelines

1. Stream and lakeside AHMU would be identified and documented prior to project design or layout for any activity affecting fish habitat.

2. At a minimium, AHMU would include the area up to 100 horizontal feet from the edges of all perennial streams, lakes, and other bodies of water. The AHMU would also include adjacent areas dominated by riparian vegetation and other areas which substantially influence the riparian zone through inputs of nutrients, energy, or large woody debris. The AHMU would also include high landslide, erosion, and windthrow hazard areas associated with streams or riparian areas.

3. Timber harvest levels, harvest methods, and road construction techniques would be designed to meet AHMU management objectives.

III General Direction - Management Objectives for Fisheries Habitat

Streams within the Management Area have been placed into three different categories based on their ability to support fish populations. These categories are defined as follows:

Class I - Streams with anadromous fish habitat or with high value resident sport fisheries. This also includes the habitat upstream from migration barriers if there is a reasonable opportunity to provide fish passage in the future.

Class II - Streams with resident fish populations which have limited sport fisheries values. These generally occur upstream of anadromous migration barriers or are steep gradient streams which preclude anadromous fish use.

Class III - Streams which do not contain significant populations of resident fish, but which have potential water quality influences on downstream fish habitat.

The management objectives for each stream class are shown below:

A. Class I: Maintain or enhance the habitat capability of all anadromous and high value resident fish habitat.

B. Class II: Maintain habitat capability for resident fish populations, to the extent practicable.

C. Class III: Maintain water quality to avoid impacts to downstream Class I and II streams.

IV. General Direction - Management Activities

Location and design of timber harvest activities, road construction, and trail construction within Aquatic Habitat Management Units require special consideration to insure that riparian area characteristics for fish habitat, water quality and other riparian dependent resources are protected.

As most fish habitat is included within the Class I streams, specific standards and guidelines for this class follow. Standards and guidelines for Class II and Class III streams are generally less restrictive than for Class I streams. Consult the Aquatic Habitat Management Handbook, FSH 2609.24.

A. Maintain existing stream bank and stream channel conditions with specific reference to: width-to-depth ratio, pools and riffles, undercut banks, stable debris, and other instream cover characteristics.

Standards and Guidelines

1. Directionally fall timber away from streamcourses (include lining and jacking as necessary).

2. Use streams as split lines whenever possible (i.e. logs should be yarded away from the stream in both directions rather than across the channel.)

3. Fully suspend any trees or products yarded across streamcourses.

4. Felled or windfallen trees designated for removal from streamcourses will not be limbed until clear of the streamcourse.

5. Remove all small, unattached debris introduced into the streamcourse by human activity within 48 hours of its introduction.

6. Leave standing all trees which affect streambank stability, including all deciduous and unmerchantable vegetation.

B. Maintain natural and beneficial quantities of large woody debris (LWD) over the short and long term.

Standards and Guidelines

1. Leave all existing (natural) instream debris.

2. Leave any trees that cannot be directionally felled away from the streamcourse.

3. Leave all windthrow in or suspended over the stream channel unless doing so would adversely effect stream channel stability. Allow salvage only if AHMU objectives are met.

4. Leave all trees inadvertently felled into or across streams in place unless doing so would adversely effect stream channel stability.

5. Leave as many of the following trees as possible within 75 ft. of the stream:

   a. deciduous trees

   b. coniferous trees less that 12 in. DBH

   c. snags

   d. trees with a 10% or greater lean toward the stream

6. Designate additional leave trees as necessary to provide for future sources of large woody debris (LWD).

7. Retain trees for LWD on both sides of the stream.

8. Design second growth management programs in riparian areas to provide future sources of LWD.

C. Maintain water quality to provide for fish production.

Standards and Guidelines

1. No ground lead yarding downhill within V-notches.

2. Revegetate areas of exposed mineral soil during the first growing season following exposure.

3. Culvert gradient should follow natural gradient for non-fish streams where needed to prevent downstream erosion.

4. Require bridge brow logs for log stringer bridges to contain bridge surfacing materials and precent entry of sediment into the stream. For further location and design guidance consult the Road Preconstruction and Drainage Structures Handbooks.

5. Maintain undisturbed ground cover as much as possible between roads and the streams.

6. Complete endhaul of waste material will be required where roads are located near fish streams when there is the probability of downhill movement of the material into the stream below.

7. Minimize the use of heavy equipment in streams. Where necessary, the timing of these activities will be restricted to avoid adverse impacts to salmonid eggs and pre-emergent fry.

D. Maintain or improve primary productivity in streams.

Standards and Guidelines

1. Normally, precommercially thin mixed stands to the streambank's edge along streams with gradients between 0 and 6 percent.

2. Manage alder immediately adjacent to the stream to provide 75 percent shade on the stream.

3. Emphasize precommercial and commercial thinning of stands along streams rather than stands that are not within the riparian zone.

4. Remove the complete canopy only along stream sections with abundant instream cover or along streams which are not temperature sensitive.

E. Maintain fish passage through stream crossing structures for adult and juvenile anadromous fish and for high quality resident sportfish.

Standards and Guidelines

1. Provide fish passage for all species on all streams with natural stream gradients of less than 4 percent.

2. For streams with gradients greater than 4 percent, evaluate the potential tradeoff between the loss of rearing fish production and the cost of providing passage for juvenile fish. Consult the Aquatic Habitat Management Handbook, FSH 2609.24 for the method of making trade-off comparisons.

Activity: Monitoring NAS Code: CF121

General Direction - Management Areawide Monitoring

Conduct monitoring programs of all MIS or their habitats to determine the effects of implementing the projects approved in the Management Area Analysis.

Activity: Fish Habitat Improvement NAS Code: CF22

General Direction

Enhance fish habitat to meet the objectives identified in the Management Area Analysis.

Standards and Guidelines

1. Evaluate potential fish habitat improvement projects identified in the plan with on-the-ground surveys to determine project feasibility.

2. Refer feasible projects to the Regional Salmon Planning Team for their review and for inclusion into the Prince William Sound Comprehensive Salmon Plan.

3. Schedule and implement feasible fish habitat improvement projects to meet the objectives of the plan.

4. If additional fish habitat improvement opportunities are identified during resource development activities or through contacts with the public or other agencies, they will be evaluated for feasibility and added to the 5 year fish enhancement plan. High priority projects may replace habitat improvement projects identified in the plan so long as the objectives of the plan are met.

5. Coordinate fish habitat improvement projects with other resource development activities whenever possible.

Activity: Fish Habitat Project Maintenance NAS Code: CF23

General Direction

Provide for the maintenance of fish habitat improvements.

Low Gradient Floodplains
(Channel types B1, B8, C1, C3, C4, C6, D4, D5)

	Stream Class
	I
Objective	-Maintain or enhance aquatic biological productivity. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Restore stream and/or watershed condition. -Maintain/manage mature forest characteristic habitat for riparian dependant wildlife species. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain long term supply of woody debris sources within the process group. -Allow no activities causing floodplain destabilization.
Harvest Control	-Allow no programmed harvest within 0 to 60 windfirm feet of B1 or B8 channel types not associated with other channel types. -Allow single tree selection harvest method within 60 to 200 windfirm feet of B1 or B8 channel types not associated with other channel types. -Allow no programmed harvest within 0 to 200 windfirm feet for the remainder of channel types. -Consider all harvest methods, on a case-by-case basis, if riparian is greater than 200 feet. -Maintain 90% of the optimum basal area with tree 16"+ dbh within the no programmed harvest area.
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams. -Allow salvage in the no programmed harvest area while meeting objectives.
Roading	-Locate roads in this area only when other reasonably feasible routes do not exist.

NOTES: -Timber harvest guidelines may vary,based on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers)

High Gradient Incised Channels
(Channel types A1,A2,A4,A5,A6,A7,B7,D2,D7)

	Stream Class
	III
Objective	-Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel intergrity.
Harvest Control	-Allow harvest to streambank while meeting objectives. -Full suspension required to cross stream channel.
Salvage	-Allow salvage while meeting objectives.
Roading	-Special road construction techniques may be required to maintain water quality

NOTE: -Timber harvest guidelines may vary, based on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Stream Classes I and II do not normally occur in this channel type group.

Estuary Channels
(Channel types E1,E2,E3,E5)

	Stream Class
	I
Objective	-Maintain or enhance aquatic biological productivity. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparian dependent wildlife species. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance.
Harvest Control	-Allow no programmed harvest within 500 windfirm feet of E1 and E5 estuarine channels. -Allow no programmed harvest within 200 windfirm feet of E2 and E3 estuarine channels. -Allow unevenage management for remainder of area. -Maintain 90% of the optimum basal area with trees 16"+ dbh within the no programmed harvest area.
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams -Allow salvage in all other areas while meeting objectives.
Roading	-Juvenile fish passages may require special attention.

NOTE: -Timber harvest guidelines may vary, based on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers).
-Stream Classes II and III do not normally occur in this channel type group.

Alluvial Fans
(Channel types A3, B5, D1, D6)

	Stream Class		
	I	II	III
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Allow no activivities causing floodplain destabilization. -Restore stream and/or watershed condition. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic riparian dependent wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Allow no activies causing floodplain destabilization.	-Allow no activities causing floodplain destabilization. -Allow no soil disturbing acticities that will still produce sediment one year after disturbance.
Harvest Control	-Allow no programmed harvest within active portion of fan or 60 windfirm feet of streambank, whichever is greater. -All harvest methods are available on remaining inactive portion of fan while meeting objectives.	-Allow no programmed harvest within active portion of fan or 25 windfirm feet of streambank, whichever is greater. -Single tree selection 25 to 60 windfirm feet from streambank if not within active portion of fan.	-Allow no programmed harvest within active portion of fan or 25 windfirm feet of streambank, whichever is greater. -All harvest methods are available on remaining inactive portion of fan while meeting objectives.

Alluvial Fans (Cont.)
(Channel types A3, B5, D1, D6)

	Stream Class		
	I	II	III
Harvest Control (Cont.)	-Maintain 90% of the optimum basal area with trees 16"+ dbh within the no programmed harvest area.	-All harvest methods are available on remaining inactive portion of fan while meeting objectives. -Harvest not to exceed 50% of the forest land of individual fan. Remaining forest land not to be harvested until created openings contain 50 foot conifer trees (approx. 30 years).	-Harvest not to exceed 50% of the forest land of individual fan. Remaining forest land not to be harvested until created openings contain 50 foot conifer trees (approx. 30 years).
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams. -Allow salvage in the no programmed harvest areas while meeting objectives.		-Allow salvage in all areas while meeting objectives.
Roading	-Special road construction techniques may be required to ensure fish passage.		

NOTES: -Timber harvest guidelines may vary, based on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers).

Low Gradient Nonforested Channels and Moderate Gradient Footslope Channels
(Channel types B2,B3)

	Stream Class		
	I	II	III
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparianildlife dependent wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel integrity.	-Maintain streambank and channel intergrity. -Allow no soil disturbing acticities that will still produce sediment one year after disturbance.
Harvest Control	-Allow single tree selection only.	-Allow single tree selection within 25 windfirm feet of B2 channels. -Allow single tree selection within 60 windfirm feet of B3 channels. -All harvest methods are available on remaining area.	-Allow single tree selection within 25 windfirm feet of B2 channels. -All harvest methods are available on remaining area while meeting objectives.
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams. -Allow salvage in the no programmed harvest areas while meeting objectives.		-Allow salvage in all areas while meeting objectives.
Roading	-Special road construction techniques may be required to ensure fish passage.		

NOTES: -Timber harvest guidelines may vary, bases on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers).

Lakes and Ponds
(Channel types L, L3, L4, L5)

	Stream Class		
	I	II	III
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparian dependent wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance.	-Allow no soil disturbing acticities that will still produce sediment one year after disturbance.
Harvest Control	-Allow uneven age management within 200 feet of lake. -Any harvest method applies for remainder of area while meeting objectives.	-Allow uneven age management within 100 feet of lake less than 500 acres in size. -Allow uneven age management within 200 feet of lakes greater than 50 acres in size -Any harvest methods apply for the remainder of the area while meeting objectives.	-Maintain a minimum of 50% shading vegetation if temp-ture sensitive lakes occur. -Any harvest methods apply while meeting objectives.
Salvage	-Generally, do not salvage windthrown trees suspended over or in lakes, ponds, or sloughs. -Allow salvage in all other areas while meeting objectives.		-Allow salvage in all areas while meeting objectives.
Roading	-Roads may be allowed if other practical alternatives are not available or if needed to access the water body for recreation or other needs.		

NOTES: -Timber harvest guidelines may vary, bases on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.

Moderate Gradient Incised Channels
(Channel types B4, B6)

	Stream Class		
	I	II	III
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparian dependent wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel integrity.	-Maintain streambank and channel intergrity. -Allow no soil disturbing acticities that will still produce sediment one year after disturbance.
Harvest Control	-Selectively leave trees with crowns that do not extend above slope break. -Minimize soil distubance associated with yarding within inner gorge. -Maintain near natural snag component of stand. -No harvest within 25 feet bank.	-Selectively leave trees with crowns that do not extend above slope break. -Minimize soil disturbance associated with yarding within inner gorge.	-All harvest methods apply while meeting objectives.
Salvage	-Generally, do not salvage windthrown trees suspended over or in stream.		
Roading	-Road construction is generally not appropriate in this process group. Where road crossings are required, minimize erosion and sediment associated with road crossing approaches within inner gorge.		

NOTES: -Timber harvest guidelines may vary, bases on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.

Large Low Gradient Incised Channels
(Channel types C2, C5)

	Stream Class	
	I	II
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel interity -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparian dependant wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel integrity.
Harvest Control	-Allow no programmed harvest.	-Allow no programmed harvest within 25 windfirm feet of streams. -Minimize soil disturbance associated with yarding within inner gorge. -Full suspension yarding required to cross stream channel.
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams.	
Roading	-Road construction is generally not appropriate in this process group. Where road crossings are required, minimize erosion and sedimentation associated with road crossing approaches within inner gorge.	

NOTES: -Timber harvest guidelines may vary, bases on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers).
-Stream Class III does not normally occur in this channel type group.

Placid or Glide Channels
(Channel types L1, L2)

	Stream Class	
	I	II
Objectives	-Maintain or enhance aquatic biological productivity. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel interity -Allow no measurable reduction in smolt habitat capability except when natural processes result in greater change. -Maintain/manage mature forest characteristic habitat for riparian dependant wildlife species.	-Maintain habitat capability for resident fish to the extent practicable. -Allow no soil disturbing activities that will still produce excessive sediment one year after disturbance. -Maintain streambank and channel integrity.
Harvest Control	-Allow no programmed harvest. -Allow incidental tree selection (e.g. bridge stringers)	
Salvage	-Generally, do not salvage windthrown trees suspended over or in streams. -Non-ground disturbing salvage permitted while meeting objectives (e.g. helicopter)	
Roading	-Roading is generally not appropiate in this process group.	

NOTES: -Timber harvest guidelines may vary, bases on site specific analysis, in order to meet Aquatic Habitat Management Unit objectives.
-Incidental cutting of trees may be allowed in areas not programmed for harvest on a case-by-case basis. (ex. bridge stringers).
-Stream Class III does not normally occur in this channel type group.

F. The following table provides additional Standards and Guidelines for timber harvest activities within riparian zones. Distances are in horizontal feet. Distances shown are to be windfirm; greater distance may be required to achieve reasonable assurance that windthrow will not occur within the windfirm distance as a result of adjacent harvest activity.

RESOURCE: Subsistence

Activity: Subsistence NAS Code: _____

I. General Direction - Subsistence

A. Provide for the continuation of the opportunity for subsistence uses by rural Alaska residents, including both natives and non-natives.

B. For the purposes of identifying fish and wildlife subsistence users, the Forest will use definitions for rural and non-rural areas established by the Alaska Boards of Fisheries and Game.

C. All Forest management activities shall be located and managed considering impacts upon rural residents who depend upon subsistence uses of the resources of national forest lands, in compliance with Section 810 of ANILCA.

Standards and Guidelines

1. Conduct an evaluation of proposed management activities according to Section 810 of ANILCA and the FSH Subsistence Management and Use Handbook.

2. Conduct notice and hearings if the subsistence evaluation and finding show that subsistence use of resources may be significantly restricted by the proposed action.

D. Monitor subsistence uses and activities in cooperation with appropriate State and Federal agencies.

E. In cooperation with appropriate State and Federal agencies, maintain a subsistence research program and data base.

F. Maintain reasonable access to subsistence resources.

Standards and Guidelines

Permit appropriate use for subsistence purposes of snowmobiles, motor boats, and other means of surface transportation traditionally employed for such purposes by rural Alaska residents, subject to reasonable regulations.

G. Allow for subsistence use in traditional use areas.

H. Consult Alaska Land Use Council subsistence guidelines.

I. Consider subsistence users needs in the scheduling, location and design of management activities.

J. In the development of access and facilities, seek opportunities to provide for subsistence users (eg. anchorages and shelters). Such access and facility opportunities should be identified and planned with local subsistence users.

RESOURCE: Threatened, Endangered and Sensitive Species

Activity: Threatened, Endangered and Sensitive Species NAS Code: CT11

I. General Direction - Threatened and Endangered Species

Meet the requirements of the Endangered Species Act, as amended.

Standards and Guidelines

1. Utilize informal and formal consultation procedures, and conference procedures (which ever is appropriate) with the National Marine Fisheries Service and the U. S. Fish and Wildlife Service for all major construction activities and other forest management activities which may have an affect on federally listed threatened, endangered, proposed or candidate species.

2. Implement National and Regional Forest Service policy and direction for management of threatened, endangered, proposed and candidate species (Consult FSM 2670).

II. General Direction - Montague Vole Habitat Management

Provide for the identification and maintenance of Montague vole (candidate species) habitat to insure habitat protection until final determination of the status of the species is completed.

Standards and Guidelines

1. Continue with ongoing surveys of Montague vole distribution and habitat use on the Management Area.

   Priority would be given to dry muskeg and uplifted beach areas prior to project implementation.

2. Design and locate development activities to minimize disturbance to identified Montague vole habitat.

III. General Direction - Sensitive Species

Implement National and Regional Forest Service policy and direction for the identification and management of sensitive species (Consult FSM 2670).

Standards and Guidelines

When population or habitat declines for a plant or animal species become of Forest Service concern, the Forest shall evaluate the particular species for approval/placement on the Regional sensitive species list by the Regional Forester.

RESOURCE: Wildlife

Activity: Wildlife Habitat Inventory NAS Code: CW111

I. General Direction

A. Complete a Management Area-wide habitat inventory prior to forest plan revision.

Standards and Guidelines

1. Complete the on going plant association inventory and classification for both forested and non-forested lands.

2. Incorporate, Forest Level Extensive Inventory (Stage I), timber stand exams and U.S. Fish and Wildlife wetland inventories.

B. Gather adequate information to verify, improve or develop Management Indicator Species (MIS) habitat capability models prior to Forest Plan Revision.

Standards and Guidelines

1. Initiate surveys and inventories to identify population levels, habitat use patterns, and potential limiting factors for MIS within the Management Area. Give priority to the following:

a. Initiate a study to validate the Prince William Sound Sitka black-tailed deer model snow variables.

b. Establish baseline habitat use and season of use information for Prince William Sound Canada geese.

2. Inventories should be correlated with plant association delineations and when applicable with the Alaska Department of Fish and Game "uniform coding units". Uniform coding units are the land areas by which ADF&G population and harvest data is collected and summarized.

Activity: Wildlife Habitat Planning NAS Code: CW112

I. General Direction - General Habitat Planning/Coordination

A. Plan and develop wildlife population goals with the Alaska Department of Fish and Game for the emphasis MIS species.

B. Cooperate with the State in regulating vehicle, boat, and other human use as necessary to achieve wildlife objectives, recognizing the access provisions of ANILCA. Emphasis for reducing human disturbance would be given to high value habitat areas and during critical periods of wildlife use.

C. Reduce human disturbance to high value wildlife habitat areas by developing an interpretive program as necessary.

D. Project planning would consider the habitat needs of Management Indicator Species consistent with the objectives.

E. Initiate efforts to determine feasibility of a mountain goat introduction on Montague Island in cooperation with the Alaska Department of Fish and Game.

II. General Direction - Sitka Black-tailed Deer Habitat Management

Provide the best possible winter range habitat condition for Sitka black-tailed deer compatible with the management objectives of the prescription area.

Standards and Guidelines

1. Limit all activities that may impact deer during winter and spring where these animals remain concentrated due to deep snow conditions.

2. Roads on uplifted beach should be located as far as practical seaward from upland vegetation that provides cover for wintering deer.

III. General Direction - Bear Habitat Management

Implement a program (in cooperation with the Alaska Department of Environmental Conservation and Alaska Department of Fish and Game) to prevent habituation of bears to human foods/garbage and reduce chances of human/bear incidents.

Standards and Guidelines

1. Require special use permits, etc.

2. Install bear proof food storage and refuse disposal facilities when necessary.

3. Disposal sites would be maintained in a sanitary condition and treated in a manner to prevent wildlife from being attracted to and/or adversely influenced by artificial supplied food sources.

5. Utilize seasonal closures of roads and trails to avoid unacceptable levels of human/bear interactions.

IV. General Direction - Bald Eagle Habitat Management

The National significance of the bald eagle dictates that its habitat would be given special protection through specific Forest Service management measures developed in conjunction with the U.S. Fish and Wildlife Service.

Standards and Guidelines

1. Establish the 330 foot eagle nest zone, as specified in the Forest Plan.

   Determine the exact boundary based on local topography, timber type, windfirmness and other factors.

2. Maintain the eagle nest zone even though the nest or nest tree becomes inactive.

3. Retain trees suitable for use by eagles for nesting, feeding, roosting and perching. Consider the following:

   a. Trees that dominate or co-dominate a shoreline.

   b. Trees with large enough branches to support eagles.

   c. Trees with open crowns for easy access and exit and good visibility.

   d. Selection criteria for perch and roost trees:

      i. Preferred: narrow fringe of mature trees immediately adjacent to the coastline.

      ii. Spike-top trees or snags or other nonmerchantable trees.

4. Prohibit operational use of herbicides and pesticides which cause egg shell thinning or other problems in birds of prey.

5. Include special clauses and specifications in contracts, special use permits, fire wood permits, and sawtimber free use provisions that incorporate bald eagle habitat protection and management measures.

V. General Direction - Raptor Habitat Management (other than eagles)

Identify and protect any cliff areas and snag or tree that is determined to be used for nesting raptors.

Standards and Guidelines

1. Nest site and population data would be maintained in cooperation with the U. S. Fish and Wildlife Service.

2. Plan project activities to avoid adverse impacts to nesting.

3. Mitigation by nest sites identified during project implementatin would be handled on a case by case basis.

4. Cliffs used by raptors will not be used as a rock source.

5. Roads should be located as far as practical from cliffs.

VI. General Direction - Snag/Cavity Nesting Habitat Management

Provide habitat for snag/cavity nesting wildlife species to ensure that viable populations are maintained.

Standards and Guidelines

1. Retain snags, within all prescription areas allowing timber harvest. Refer to the following when planning:

   a. Retain soft and hard snags where possible, considering safety needs for people and equipment and visual quality (e.g., snags on skyline can be removed).

   b. Where possible, save both hard and soft snags in areas protected from wind.

   c. Snags do not need to be evenly distributed; clumped distributions are preferred; leaving windfirm buffers around snags or groups of snags.

   d. Snags or snag groups may be designated as wildlife trees or habitat and marked to reserve them from harverst.

   e. Consider leaving live trees, preferably in groups, for future snag recruitment.

   f. Consider leaving non-merchantable trees standing, especially ones that show signs of heart-rot.

VII. General Direction - Riparian/Wetland Habitat Management

Provide for the protection and maintenance of Prince William Sound Canada Geese and other riparian and wetland wildlife.

Standards and Guidelines

1. Minimize disturbance of geese and waterfowl by restricting, when practical, development and other concentrated human activities to periods when geese and waterfowl are absent from the area.

2. Maintain habitat capability in coastal wetlands and intertidal areas that are important migratory staging areas and fall/winter/spring concentration areas, and wetlands that are important nesting and brood-rearing habitats, by avoiding where practical all development activities which could fill wetlands, drain wetlands, or alter water levels resulting in loss of desirable vegetation, or direct loss of habitat.

3. Management activities should be avoided within 330 ft (100 meters) of geese habitat when they are present during nesting, brood rearing, molting and wintering periods.

4. Properly dispose of spoils and contaminates to assure leaching of toxic substances do not contaminate water course and wetlands.

VIII. General Direction - Marine Mammal Habitat Management

A. Provide for the protection and maintenance of harbor seal, steller sea lion and sea otter habitats to minimize impacts on marine mammal haul out and concentration areas.

Standards and Guidelines

1. Locate facilities and concentrated human activities as far from known marine mammal haul outs and concentration areas as practical.

2. Consider opportunities for viewing and interpretation.

IX. General Direction - Seabird Rookery Management

A. Provide for the protection and maintenance of marine bird rookeries.

Standards and Guidelines

1. ocate facilities and concentrated human activities to minimize impacts on known seabird colonies.

2. Provide opportunities for viewing and interpretation.

Activity: Monitoring NAS Code: CW121

I. General Direction

Conduct monitoring programs of all MIS or their habitats to determine the effects of implementing the approved projects.

Standards and Guidelines

1. MIS populations and/or habitats would be monitored as described in the MIS monitoring Plan (Appendix C).

2. Conduct on-the-ground assessments of the implementation of activities which have the potential to effect wildlife habitat to determine if objectives were met.

3. Monitor selected wildlife habitat rehabilitation, mitigation, and enhancement projects to determine if projects objectives have been met.

Activity: Wildlife Habitat Improvement NAS Code: CW22

I. General Direction

Design precommercial thinning activities to encourage rapid growth and early development of habitat characteristics (large branches to intercept snow and an open canopy to promote understory forage development) in high value deer winter ranges compatible with the management objectives of the prescription area.

RESOURCE: Timber

More detailed standards and guidelines are found in R-10 Forest Service Handbooks 2409.26d - Silvicultural Examination and Prescription Handbook, 2409.18 - Timber Resource Planning Handbook, and 2409.24 - Timber Sale Preparation Handbook. These handbooks are updated regularly to reflect current management techniques and practices.

Activity: Silvicultural Examination and Prescription NAS Code: ETlll-2

I. General Direction - Stage II Intensive Inventory

A. Silvicultural examinations including stocking surveys will be conducted as part of Forest Plan implementation.

Standards and Guidelines

Stocking survey priorities in order of importance are:

Stands on Montague Island scheduled for precommercial thinning.

B. Written silvicultural prescriptions are required for all proposed Oesource management activities where vegetative manipulation of the forest is involved and will be accomplished as part of project planning.

Standards and Guidelines

1. A certified silviculturist will prepare or approve a detailed silvicultural prescription for all stands scheduled for silvicultural treatment (logging, site preparation, planting, precommerical thinning, etc.)

2. The prescription will be based on a recent silvicultural examination of the stand, sound silvicultural practices, and management objectives and direction for the area.

Activity: Timber Resource Planning NAS Code: ETll2

I. General Direction

Provide timber resource information necessary to prepare projects and for Forest Plan revision.

Standards and Guidelines

1. The District is responsible for providing all timber information resulting from current inventories, sale layout, or other vegetative management activities.

Activity: Timber Resource Coordination NAS Code: ET113

I. General Direction

The annual district timber program will identify what technical support will be necessary from other resource programs.

Activity: Timber Sale Preparation NAS Code: ET114

Standards and Guidelines

1. Leave any trees that will be needed for guyline and tailtree anchors, or lifttrees on future units in subsequent entries; if stumps are to be used, consider time between sales.

II. General Direction - Harvest systems

A. Stand clearcutting is the preferred harvest system.

B. Optionally, use individual tree or group selection for salvage cutting.

C. Use individual tree, group selection, shelterwood cutting, or strip clearcutting in Aquatic Habitat Management Units and for harvest in prescribed areas where timber is removed to enhance or attain other resource management objectives.

D. Where prescribed in the management area, the objective of strip clearcutting is to harvest and regenerate the stand in two entries while maintaining 50 percent of the stand for deer winter habitat during the initial entry.

Standards and Guidelines

1. Harvest strips should not exceed a horizontal width of 300 feet.

2. Leave strips should have a minimum horizontal width of 300 feet.

3. Harvest strips should run perpendicular to streamcourses to the extent practicable.

4. Require felling to the lead in strips to be harvested.

5. Layout harvest strips to ensure windfirm boundaries.

III. General Direction - Salvage Harvest

A. Salvage cutting is the harvesting of individual dead or dying trees wherever they may occur, provided there is no management prescription limitation.

Standards and Guidelines

1. Salvage trees damaged in road construction.

2. Salvage mortality and blowdown as it occurs.

B. Trees salvaged in a prescriptive area excluded from scheduled timber harvest (unsuitable forest land) will not be included as chargeable volume to the allowable sale quantity. These lands will not be substituted for suitable forest land.

C. Beach log salvage often involves both State and National Forest system lands. A Memorandum of Understanding between the State of Alaska and the Forest Service on coordination of beach log salvage, dated April 23, 1980, will provide direction.

Standards and Guidelines

1. The State and Forest Service will make combined beach log salvage sales. The party with the largest share of material will sell and administer the sale.

2. Beach logs are considered excess and may be exported.

3. Beach logs that are not merchantable will be utilized for personal use whenever possible.

D. Beach log salvage material is not included in the growth and yield projections of the Forest Plan and is not chargeable to the annual allowable sale quantity.

Activity: Timber Resource Monitoring NAS Code: ET121

I. General Direction

Timber resource monitoring will be accomplished in accordance with the guidelines in the Forest Monitoring Plan.

Activity: Reforestation Certification NAS Code: ET121-1

I. General Direction

A. Monitor areas that have been reforested to insure management objectives have been met as directed in the Forest Monitoring Plan.

Standards and Guidelines

1. Certify that a reforested area has attained a stocking level above a defined minimum in terms of number and distribution of acceptable species, whether planted, seeded, or natural.

2. Before an area of reforested land may be certified as satisfactorily stocked, the re-established tree seedlings must have survived and be thriving three or more full growing seasons after planting, seeding, or natural regeneration.

Activity: Timber Stand Improvement Certification NAS Code: ET121-2

I. General Direction

Monitor areas that have received precommercial thinning or release and weeding treatments to insure management objectives have been met as directed in the Forest Monitoring Plan.

Standards and Guidelines

Certify that the treatment met the objectives of the silvicultural prescription. In the case of thinning, it normally means certifying that the stocking of desired residual trees meets prescribed standards.

Activity: Commercial Sale Administration NAS Code: ET122

I. General Direction

A. Administer timber sale contract provisions, post sale measurement, and financial oversight of all sales.

Standards and Guidelines

1. Frequency of timber sale inspection will be determined by the complexity of the timber sale and operator performance, with the objective being to ensure full contract compliance.

2. In prescriptive areas where other resource values are emphasized, the sale administrator will work with the appropriate resource specialist(s) (wildlife biologist, fisheries biologist, landscape architect, recreation specialist, etc.) to ensure that the project goals are met.

Activity: Reforestation NAS Code: ET24

I. General Direction

Natural regeneration should be used to reestablish desirable tree cover after deforestation, wherever possible.

Standards and Guidelines

Prescribed burning can be used for preparing sites for planting, seeding, and for other resource needs. It may also be used for fuel management, when the wood residue cannot be used for other purposes.

I. General Direction

A. Manage stands to improve species composition, overall stand health and growth rates.

Standards and Guidelines

1. Tree spacing will be based on the objectives of the prescriptive area.

2. Prioritize managed growth stands according to stand site index, thinning stands with the highest site index first.

3. Favor dominant or selected species that are more or less evenly distributed over the stand by removing a varying proportion of the other trees.

RESOURCE: Soil and Water

Activity: Watershed Resource Planning NAS Code: FW112

I. General Direction

A. Plan and conduct land use activities to avoid adverse effects on the soil and water resources, and to maintain water of quality and quantity sufficient to maintain beneficial uses.

Work cooperatively with other Forest resource groups, State, Federal and Local government agencies and Native American corporations for the protection, mitigation, and/or enhancement of the water and soil resources.

Standards and Guidelines

1. Apply Process Best Management Practices (BMPs) or applicable Standard BMPs to projects, to provide non-point water quality protection to meet federal, state and local water quality requirements.

   a. Process BMPs refer to custom fit practices, measures or methods developed for projects through inventory and analysis, and interdisciplinary involvement.

   b. Standard BMPs are established (fixed) methods,or measures that are applied to projects.

2. Project plans for all projects with soil disturbance will include erosion/stabilization measures.

3. Delineate on appropriate project area maps the location of soil and water protection areas to insure their recognition, proper consideration, and protection.

Activity: Watershed Resource Administration NAS Code: FW12

I. General Direction

A. Manage non-designated domestic use watersheds to maintain water suitable for human consumption within the realm of State water quality standards and water supply regulations. Consult State Water Quality Standards (18 AAC 70.020).

Standards and Guidelines

1. Identify appropriate soil and water quality standards before implementation of project-level activities.

B. Manage activities on wetlands (including estuaries and tidal meadows), floodplains, and riparian areas to avoid adverse soil and water resource impacts.

Standards and Guidelines

1. Minimize implementation of land use disturbance activities on wetlands.

2. Conduct all activities on wetlands and riparian areas in accordance with the Draft Best Management Practices (BMP).

3. Refine wetland data and interpretation maps as needed on a case-by-case basis for project planning.

4. Seek cooperation from State and Federal agencies having overlapping resource management responsibilities for these land classifications. Execute plans and decisions in a manner consistent with the statutory responsibilities of these agencies.

Activity: Watershed Resources Monitoring NAS Code: FW121

I. General Direction

A. Monitor land disturbing activities to determine effects of these activities on soil productivity & erosion, water quality and quantity. Monitor soil and water at three distinct monitoring levels consisting of:

Consult FSM 2520 and 2530, R-10 Water Quality Monitoring handbook, and State Water Quality Standards

Standards and Guidelines

1. At project planning and implementation level document effectiveness and validation of BMP's.

   This includes:

   a. The monitoring objective.

   b. The Rationale behind each of the parameters and evaluation criteria.

   c. Who is to be involved and their roles and responsibilities.

   d. What parameters will be monitored and evaluated.

   e. When, where, and how often monitoring will occur.

   f. What methodologies and sampling techniques will be used for monitoring evaluation and analysis.

   g. How will results be interpreted and reported.

2. Select projects to monitor and evaluate the results of BMPs on soil and water resources to prevent and reduce non-point water pollution.

3. For each project develop a non-point source monitoring plan that tracks and records:

   a. identification of the land disturbing activities

   b. design of BMPs

   c. application of BMPs

   d. monitoring

   e. effects reporting

   f. any correction actions required

   g. feedback to BMP designs

4. Cooperate and participate with the State of Alaska through the Water Quality Cooperative Agreement to identify and monitor non-point source pollution, and implementation and effectiveness of BMPs.

5. Monitor soil disturbance and/or water quality when management activities remove vegetation or disturb the surface mineral soil.

6. Monitor annually all watershed improvement projects until final evaluation of the projects indicates that maintenance is no longer needed.

Activity: Watershed Resource Improvement NAS Code: FW2

I. General Direction

A. Protect or improve water quality and and soil productivity.

Standards and Guidelines

1. Conduct Watershed Condition Surveys to determine the improvement needs.

2. Complete a watershed improvement plan for all watershed improvement projects. Consult FSM 2520.

3. Use the Forest Watershed Improvement Needs Inventory (WINI) for identification and prioritization of treatment to soils, stream banks and channels. Consult FSM 2510.

4. Give priority to treatment of soil sites, stream banks and channels with the highest erodible conditions directly affecting fish and water resources.

5. Whenever possible, use indigenous plants and materials for revegation.

RESOURCE: Minerals and Geology

Activity: Minerals and Geology Administration NAS Code: GM12

I. General Direction - Forest lands open to mineral entry

A. Encourage the exploration, development, and extraction of locatable and leasable minerals and energy resources.

B. Permit reasonable access to mining claims in accordance with the provisions of an approved plan of operations.

II. General Direction - Forest lands withdrawn from mineral entry

A. Claimants with claims located in areas withdrawn from mineral entry retain valid existing rights if such claims were located prior to the withdrawal date.

B. Conduct on the ground validity examinations by a qualified minerals examiner to establish or reject valid existing rights on active mining claims within withdrawn areas.

C. Permit reasonable access to mining claims in accordance with the provisions of an approved plan of operations.

III. General Direction - Plan of Operations

A. A Notice of Intent and/or a plan of operations is required for locatable, leasable, and saleable minerals. (Consult FSM 2810, 2820, 2850, and 36 CFR 228)

Standards and Guidelines

1. A plan of operations will receive prompt evaluation and action within the timeframes established in 36 CFR 228.

2. Conduct an environmental analysis for all operating plans and prepare appropriate NEPA documentation.

3. Operating plans will include provisions for reclamation.

B. Work with claimants to develop a plan of operations that mitigates to a reasonable extent adverse impacts to the management area. The following management practices may be applied as appropriate to reduce resource impacts.

Standards and Guidelines

1. Take advantage of topographic and vegetative screening when locating drill rigs and pumps, roads, rock quarries, structures, and log transfer facilities

2. Locate material sites and log transfer facilities outside of sensitive areas if reasonable alternatives exist.

3. Apply timing restrictions to in stream construction as needed to protect fisheries habitat and mitigate adverse disturbance of stream sediments.

4. Use sedimentation traps as needed to mitigate adverse stream sedimentation.

5. Revegetate disturbed areas with indigenous vegetation within one year to restore and promote wildlife habitat and hasten meeting the Visual Quality Objective. .

6. Design reclamation plans so mineral activities leave a natural appearing condition.

7. Quarry back walls visible from sensitive travel routes should be reduced in height and/or designed to have an irregular back line.

8. Haul away, bury, burn or scatter vegetation removed from the project.

9. Contour spoil/disposal areas in relation to the surrounding landscape as seen from sensitive view points.

10. Except when warranted by safety considerations avoid use of reflective materials in project facilities.

11. Apply timing restrictions to minerals activities as needed during critical wildlife breeding, and migrating periods to minimize adverse impacts to wildlife.

12. Coordinate the location of the mining transportation systems with the the Forest transportation plan.

13. Coordinate with claimants to ensure mining activities, markers and improvements do not interfere with other Forest management activities.

IV. General Direction - Bonds

Require reclamation bonds to ensure completion of site reclamation for locatable, leasable, and saleable mineral operations. (Consult 36 CFR 228)

V. General Direction - Mineral Materials

A. Permit mineral material sites only after an environmental analysis assures that other resources are adequately protected, and the site location and operating plan are consistent with the management area emphasis. Require bonds and reclamation. (Consult FSM 2850 and 36 CFR 228)

B. Where the opportunity exists, design, excavate, and reclaim material sites to facilitate their use for dispersed recreation or other desirable uses such as conversion to salmon rearing ponds and spawning channels.

VI. General Direction - Monitoring

Complete compliance inspections on a frequency schedule commensurate with the complexity and sensitivity of the project.

Standards and Guidelines

Complete one compliance inspection per year as a minimum for each approved plan of operation.

RESOURCE: Lands

Activity: Lands Preparation NAS Code: JL11

I. General Direction - Land Status

Perform a thorough land ownership review during early project planning stages, to ensure protection of State, private, and other Federal Agency rights and interests.

Standards and Guidelines

1)Consult resources, such as BLM Master Title Plats (MTP's), in addition to the land atlas.

II. General Direction - Coordinating with Others

A. Coordinate activities on National Forest System land with adjacent State and private landowners, through the NEPA process.

B. Coordinate with Alaska Office of Management and Budget, Division of Governmental Coordination, to ensure activities are consistent, to the maximum extent practicable, with the Alaska Coastal Zone Management Program.

C. Coordinate activities on encumbered lands with interest holders, as appropriate.

Activity: Special Use Administration (non-Recreation) NAS Code: JL122

I. General Direction - General

A. Manage special use authorizations to best serve the public interest, in accordance with the following standards and guidelines. (Consult 36 CFR 251)

Standards and Guidelines

1. Do not authorize private uses of National Forest System lands when such uses can be reasonably accommodated on other lands.

2. Review new requests for compatibility with management area prescriptions, based on a consideration of environmental values, economic feasibility, and a determination of social and economic benefits.

3. Review and adjust special use fees on a planned basis to comply with the Federal Land Policy and Management Act and Forest Service policy.

4. Upon renewal or transfer of a permit, terminate or bring into conformance, existing uses which are not compatible with the Forest plan or with the purposes for which the area was established.

5. On lands selected by State and Native Corporations, obtain concurrence from the appropiate entity, in accordance with the Alaska National Interest Lands Conservation Act, Section 906 (k) and Forest Service Manual Policy.

6. Coordinate all special use permit proposals which have a direct effect on the coastal zone, with Alaska Office of Management and Budget, Division of Governmental Coordination.

II. General Direction - Cabins and Related Structures

A. Manage cabins and other structures, in accordance with the following standards and guidelines.

Standards and Guidelines

1. The construction of new cabins is prohibited with the following limited exceptions. A nontransferable, five-year special use permit may be issued in some circumstances, following a determination that: (1) the proposed use, construction, and maintenance of the cabin are compatible with management area objectives; (2) use of the cabin is directly related to administration of the area or is necessary for continuation of an ongoing activity, allowed within the area; and (3) the permit applicant has no reasonable alternative.

2. Do not permit construction of new cabins for private recreational uses or residential uses.

III. General Direction - Temporary Facilities

A. A temporary facility is defined as: "Any structure or other man-made improvement which can be readily and completely dismantled and removed from the site when the authorized use terminates".

B. Permit temporary campsites, tent platforms, shelters, and other temporary equipment, directly and necessarily related to the taking of fish and wildlife, subject to reasonable regulation to ensure compatibility, conditions of the Alaska National Interest Lands Conservation Act, Section 1316, Forest Service manual direction, and consistency with management prescription direction.

IV. General Direction - Aquaculture and Mariculture Permits

A. Cooperate with State and other Federal Agencies to meet industry and public needs for aquaculture/mariculture programs and ensure compatibility with other resources and activities.

Standards and Guidelines

1. Reviewing proposals for aquaculture and mariculture adjacent to National Forest System lands with other activities.

2. Coordinate review of aquaculture and mariculture proposals with Alaska Department of Natural Resources and Alaska Office of Management and Budget, Division of Governmental Coordination.

3. Initially, permits should be issued for low investment, minimum development, temporary, support facilities which can be readily removed from the site if the project ceases to be viable for the operator.

V. General Direction - Floathouses

A. Manage residential floathouses in accordance with the following standards and guidelines.

Standards and Guidelines

1. Issue special use permits for floathouses shoreties only at locations where the activity is specifically provided for in the Alaska Coastal Zone Management Plan or approved coastal zone area plans.

2. Cooperate with the State of Alaska and local communities to help develop criteria which address floathouse placement. In developing new State or city plans, encourage locating floathouses near communities or adjacent to private uplands.

3. As a condition of the Forest Service special use permit, require applicants to obtain all necessary authorizations from other appropriate Agencies.

VI. General Direction - Fish Camps

A. To obtain a fish camp permit, require applicants to hold a commercial set net permit from Alaska Department of Fish and Game, valid for the area in which the proposed facility is to be located.

B. Apply the following standards and guidelines to permits for commercial set net fish camps.

Standards and Guidelines

1. New facilities would usually be tent platforms and associated temporary facilities.

2. New cabins, if authorized, would not exceed 500 square feet in size.

   a. Limit new cabin authorizations to one cabin per setnet permit. If needed, authorize additional sites for use with a tent platform.

   b. If authorized, new cabins would become the property of the United States Government, as provided in the Alaska National Lands Conservation Act, Section 1303(b)(4).

3. Assign a permit tenure of one to five years for tent platforms.

4. Assign new fish camp permit holders areas up to 1/4 acres in size. Locate camps in groups to limit impacts to other areas.

5. Within areas traditionally used for fish camps, do not authorize new non-related special uses, other than uses associated with subsistence.

6. Do not allow fish camp permit holders to engage in other commercial activities from their fish camps, such as outfitter/guide or lodge/resort activities, unless already authorized by permit.

7. Consider authorizing requests for subsistence uses for commercial fish camps.

8. To obtain a fish camp permit, require applicants to hold a commercial set net permit from Alaska Department of Fish and Game, valid for the area in which the proposed facility is to be located. Camp occupancy wouldgenerally correspond to the dates of the open set net season, with exceptions allowed for camp set up and take down (if necessary) and for subsistence uses, if authorized.

VII. General Direction - Right-of-Way Grants

A. Grant reasonable access across National Forest System land to allow inholders and other land owners use of their land without unnecessarily reducing Forest Service management options or damaging National Forest lands or resources.

Standards and Guidelines

1. Accommodate new transportation and utility proposals within existing corridors.

2. Transportation analysis will be completed for an area before any permit is issued.

B. Allow the following activities to occur without requiring a special use authorization.

Standards and Guidelines

1. Allow the use of snowmachines, motorboats, airplanes, and nonmotorized surface transportation methods for traditional activities which are permitted by law.

3. This direction does not authorize the construction or maintenance of improvements or facilities on National Forest System lands, nor does it authorize use of off-road vehicles, other than snowmobiles.

Activity: Land Ownership Administration NAS Code: JL123

I. General Direction - Land Selections

A. Management decisions, will consider valid State selections (pursuant to the Alaska Statehood Act), and Native selections under ANSCA and ANILCA as amended. Apply the following standards and guidelines to Management Area encumbered, until these lands are either conveyed into State or private ownership, or they revert back to unencumbered National Forest System land.

Standards and Guidelines

Avoid Forest Service investment projects on lands encumbered by State selections, Native withdrawals or selections, or Native Allotment applications.

B. Manage State selections, entered under authority of the Alaska Statehood Act, according to the following standards and guidelines. (Consult 43 CFR 2627)

Standards and Guidelines

1. Work with State agencies and local communities to substantially eliminate Forest ownership in and adjacent to communities where State, borough, or community governmental jurisdiction should logically preside.

2. Obtain concurrence from Alaska Department of Natural Resources prior to granting any occupancy permit or contract on selected lands, in accordance with the Alaska National Interest Lands Conservation Act, Section 906(k) and Forest Service Manual policy.

C. Apply the following standards and guidelines to lands encumbered by Native selections or withdrawals, made under authority of the Alaska Native Claims Settlement Act (ANCSA), as amended, until these lands are either conveyed into private ownership, or they revert back to unencumbered National Forest System land. (Consult 43 CFR 2650)

Standards and Guidelines

1. Do not issue occupancy permits, contracts, easements, or similar authorizations on lands selected, or withdrawn for selection, by a Native corporation under authority of ANCSA, without consent from that Native corporation, unless permission is first obtained from the Regional Forester.

Activity: Landline Location and Maintenance NAS Code: JL231, JL24

I. General Direction - General

A. Apply the following standards and guidelines when maintaining established National Forest property boundary lines and corners, or when locating, surveying, and posting new National Forest property boundaries and corners.

This direction does not authorize the construction or maintenance of improvements or facilities on National Forest system lands, nor does it authorize use of off-road vehicles, other than snowmobiles.

Standards and Guidelines

1. These boundaries should not be surveyed, marked or posted, until after conveyance of the land.

2. Coordinate with BLM for original boundary line survey.

3. Maintain an inventory of surveyed and unsurveyed boundary lines to establish survey priorities. Establish program priorities to coincide with Forest Service manual direction.

Activity: Rights-of-Way NAS Code: JL

I. General Direction - Rights-of-Way Acquired

A. Acquire, across non-National Forest System land, road and trail rights-of-way which are adequate for the protection, administration, and utilization of the Chugach National Forest. (Consult FSM 5460)

Standards and Guidelines

1. Generally, acquire rights-of-way identified in project plans at least one year prior to schedule activity.

2. Generally, acquire unlimited easements, granted in perpetuity. Limited easements (e.g., those authorizing administrative use, but not public use) may be acquired only when public use is not desirable.

3. Encourage the use of cost share agreements when practicable, to avoid economic and resource impacts associated with duplicate road systems.

4. Monitor compliance with stipulations of existing rights-of-way.

5. Identify and request all needed rights-of-way across lands selected by the State or Natives, as provided by Federal law.

6. Secure adequate rights-of-way before issuing contracts or constructing facilities.

B. Acquire log transfer facility (LTF) authorizations on adjacent tidelands in accordance with the following standards and guidelines.

Standards and Guidelines

1. Coordinate LTF activities (location, construction, operation, etc.) with the local communities, adjacent land, state and federal agencies.

2. Ensure LTF activities are consistent, to the maximum extent practicable, with the Alaska Coastal Zone Management Program.

3. Acquire long term easements (preferably at least 25 years) for permanent LTF sites.

Activity: Land Ownership Adjustments NAS Code: JL26

I. General Direction - General

A. Land adjustment decisions would be based on the Forest Plan identification of lands suitable for disposal or acquisition. Consider proposals for these lands.

Standards and Guidelines

1. Work cooperatively with the State of Alaska and Native Corporations to improve land ownership patterns and management opportunities resulting from State and Native land conveyances.

2. Retain National Forest System land which best serves the public interest in Federal ownership.

3. Consolidate National Forest System lands, when practicable.

4. Generally, acquire and dispose of land with as few reservations and outstanding rights as possible.

5. Avoid separating the surface and subsurface estate, unless it is clearly in the public interest.

6. Pursue land adjustments that reduce administrative costs or increase the output of goods and services. (Consult FSM 5430)

7. Generally, pursue land exchanges on an equal value basis. Exchanges may be made for other than equal value if the parties agree and the exchange is determined to be in the public interest, as provided in Section 1302(h) of the Alaska National Interest Lands Conservation Act and Section 22(f) of the Alaska Native Claims Settlement Act, as amended.

II. General Direction - Acquisition

A. Apply the following standards and guidelines for land acquisition activities.

Standards and Guidelines

1. Acquire isolated inholdings at critical locations if public benefits would occur.

2. Within administratively designated areas, such as scenic area, generally acquire private inholdings, as opportunities arise.

III. General Direction - Disposal

A. Apply the following standards and guidelines for land disposal activities.

Standards and Guidelines

1. Do not exchange National Forest System lands selected by the State of Alaska, or a Native corporation, or lands under Native allotment application, which have not yet been conveyed, unless specifically provided for in legislation. If the party holding the encumbrance desires ownership adjustments, they may relinquish their selection. The Forest Service may then pursue land ownership adjustment.

2. Dispose of National Forest System lands which would best serve the public interest in private ownership, provided the action would not decrease ability to meet National Forest System management objectives.

3. Avoid exchanging National Forest System lands occupied under permits or easements unless the non-Federal owner and the permittee reach agreement on the disposition of existing uses.

RESOURCE: Access

Activity: Transportation System Inventory NAS Code: LT111

I. General Direction

Maintain an inventory of all forest development transportation facilities, including roads, bridges and major culverts, trails, log transfer facilities, air strips, and salt water access points.

Activity: Transportation Monitoring NAS Code: LT121

General Direction - Traffic Surveillance

Collect data about traffic volume and types on forest development roads.

Activity: Road and Bridge Administration NAS Code: LT122

I. General Direction - Road Management

Through authorities delegated by the Secretary, the Forest Service may restrict or control use to meet specific management direction. Commercial users, permittees or contractors also may be required to share in the cost of developing, improving and maintaining forest development roads.

Standards and Guidelines - Road Management

A. Allow administrative use of closed or restricted roads when needed for emergency use or otherwise deemed appropriate.

B. Road Management Objectives specify road specific standards and guidelines.

II. General Direction - Permitting

Require road use permits for commercial use of all Forest development roads. Users under a road use permit for the commercial share of their operation when transporting both National Forest products and commercial products on Forest development roads.

III. General Direction - Investment Sharing

Require investment sharing in the road system by users of Forest Development Roads for commercial hauling of non-Federal products, commodities or materials when feasible.

Activity: Transportation Planning NAS Code: LT212

I. General Direction - Road Management Objectives

Establish the specific intended purpose based on management direction, of the new project or projects. Document arterial and collector roads individually; however, similar local roads may be grouped on one document. Before construction establish and document the road management objectives showing operation and maintenance criteria.

II. General Direction - Trail Planning

A. Provide a variety of recreation opportunities by developing trails that emphasize the following:

1. Pedestrian and ATV trails that utilize the transportation system, loop trails that utilize the transportation system, loop trails and provide access to recreation features and facilities; especially providing access to alpine areas; including the provision of access through private lands to adjacent National Forest System lands (easements through Native lands).

B. Develop trails to a standard commensurate with the level of anticipated use and ROS setting. Trails developed to provide access through private land to National Forest System land will generally be developed as primitive trails.

Activity: Preconstruction Engineering NAS Code: LT214

I. General Direction - Location and Design

A. Perform route or site selection, location, geotechnical investigations, survey, and design to a technical level sufficient for the intended use of the facility.

B. The factors for determining road standards are contained in FSM 7721.13.

C. Design the road system to serve the projected traffic requirements designated in the Road Management Objectives.

D. Construct and design roads to conform to the Adopted Visual Quality Objectives.

Road Location

1. Maintain a minimum of 100 feet slope distance of undisturbed riparian vegetation between road clearing limits and the banks of active stream channels.

2. Roads located paralleling active streams shall be avoided to the extent possible.

Standards and Guidelines

1. Incorporate erosion control and stabilization measures in project plans for stabilizing roads, landings, skid trails and other human-caused soil disturbances.

2. Locate stream crossings in stable reaches.3

3. Design crossings of v-notched drainages to prevent debris jamming.

4. Culvert gradient should follow natural gradient for non-fish bearing streams where needed to prevent downstream erosion.

5. Require bridge brow logs for log stringer bridges to contain bridge surfacing materials and prevent entry of sediment into the stream.

6. Sidecasting of waste materials must not encroach upon the stream course and as much undisturbed ground cover as practicable shall be left between the road and the stream.

7. Complete endhaul of waste material will be required where roads are located near fish streams when there is the probability of downhill movement of the material into the stream below.

8. Contracts will specify permissible uses of heavy machinery and the timing of road construction activities.

9. Drainage ditches along the road bed should be sloped to the nearest culvert and should avoid leading directly into stream channels.

Stream Crossing

1. Fish passage for both adult and juvenile fish will be provided for all anadromous fish streams and designated resident sport fish streams.

2. Alaska Region Report No. 42, Road Drainage Guide for Installing Culverts to Accomodate Fish provides direction for fish passage design. Where natural stream gradients are greater than 4% or where peak flow events are extreme, structures other than culverts must be considered.

3. In stream sections influenced by intertidal fluctuations, spawning habitat capability for pink and chum salmon will be maintained fully.

II. General Direction - Wetlands, Floodplains, Estuaries, Tidal Meadows

A. Locate and design forest development roads to minimize impact to soils, water, and associated resources in accordance with Executive Order 11988 and 11990 (Floodplain Management and Protection of Wetlands).

Activity: Quarry and Borrow Sites NAS Code: LT214

I. General Direction - Quarry and Borrow Sites

A. All pits and quarries shall be approved in writing by the Forest Service prior to exploration, clearing or development. Design pits and quarries to meet visual quality objectives.

Standards and Guidelines

1. All overburden shall be removed to solid rock for a minimum distance from the working face. The minimum distance shall be shown in the Pit and Quarry Development Plans. Adjacent to primary travel routes and public use areas, overburden shall be stockpiled, respread, and seeded upon completion of the borrow excavation, whenever possible.

2. The cutbank of overburden shall be sloped to the natural angle of repose. In no case shall the slope be greater than

the steepest limit shown in the Pit and Quarry Development Plans.

3. Within clearing limits:

   a. Maximum height of stumps shall be 12 inches.

   b. Stable trees up to 6 inches diameter breast height (DBH) need not be cut if they will not interfere with back slope stability.

   c. Stumps and brush may be left in place except that all stumps that protrude from excavated banks, or that have the potential to become dislodged at any later date, shall be removed.

4. All overburden, clearing, merchantable timber, grubbing debris shall be disposed of or stockpiled for later use as shown on the Pit and Quarry Development Plans.

5. All dead trees and snags which are sufficiently tall to reach the work area shall be felled.

6. The pit or quarry shall be left in a neat, orderly and well-drained condition. All overhangs and loose rock shall be removed. Rock, loosened by blasting operations, shall be scaled from the faces prior to leaving the site.

7. After excavation is complete, the area shall be cleaned up and left as shown on the quarry development plan. Any access road will be treated as shown on drawings or quarry releases.

B. All pits and quarries should facilitate the development of fisheries spawning and rearing ponds once material has been removed if possible. A site which best facilitates fisheries projects should be chosen if more than one site is available and is economical to do.

C. All pits and quarry locations should:

   1. not be visible from arterial class roads.

   2. be located away from so as not to drain into, influence by blasting or waste material placement any Priority 1 and fish habitat streams.

   3. be located approximately 2 miles apart, less if necessary to have acceptable site conditions.

   4. be investigated to prepare a pit development plan accurately displaying size, material, physical features prior to and after development, condition to be left after use, operations during material excavation and timing of operating windows.

Stream Crossing Construction

1. To the extent possible on system roads, stream crossing structures will be permanent and installed concurrent with the initial construction. Where appropriate, full-span portable bridges may be used to facilitate continued road construction.

2. To the extent possible, construction activities directly affecting anadromous fish streams will occur within the period of May 15 through July 15. Stream crossing construction activities outside this acceptable window will be considered on a case-by-case basis.

Mitigation Actions During Stream Crossing Construction

Special road construction mitigative measures are listed in Forest Service Handbook 2609.24, Alaska Region, Aquatic Habitat Management Handbook, June 1986. Specific mitigation measures may include but are not limited to:

1. Within the period of May 15 through July 15, minimize the number of heavy equipment crossings of streams to the extent possible.

2. To the extent possible, equipment crossings should occur within the specified clearing limits of a road.

3. Heavy equipment crossings including approaches into and exits from active stream channels should utilize portable pads that minimize instream and streambank disturbances.

4. The tracks and/or wheels of heavy equipment should be washed of excessive sediment materials prior to entry into streams supporting developing salmon eggs or alevins downstream of the construction site.

5. In areas of intertidal influence, minimal equipment crossings may occur during periods of low tide. Locations of crossings will be determined on a case by case basis.

Activity: Road and Bridge Construction/Reconstruction NAS Code: LT22

I. General Direction - Construction (Incorporate by reference FSH 7709.57

Construct forest development roads and bridges. to meet Management Area Objectives.

II. General Direction - Reconstruction (Incorporate by reference FSH 7709.11 Chap 26)

A. Reconstruction of roads may occur to correct the following situations:

1. Correction of unsafe conditions that cannot be corrected by traffic restriction.

2. Repair of situations where use will cause environmental damage.

3. Upgrading of a facility that was not originally constructed to accommodate developed use as documented in the Road Management Objectives.

Activity: Road Maintenance NAS Code: LT23

I. General Direction (Incorporate by reference FSM 7732)

A. Maintain forest development roads in a condition to safely accommodate intended use and in accordance with maintenance criteria documented in the road management objectives. (FSM 7732.03 item 1)

B. Require commercial users to perform maintenance commensurate with their use of forest development roads. (FSM 7732.03 item 2)

C. Schedule and coordinate maintenance efforts of all users of Forest development roads.

Standard and Guidelines

1. Maintain forest development roads to the following minimum maintenance levels identified in the Road Management Objectives.

RESOURCE: Log Transfer Facility

Activity: Siting NAS Code: LT214

I. General Direction

Proper siting of log transfer and log raft storage facilities is the single most important means of controlling adverse water quality and biotic impacts from the construction and operation of these facilities. The least biologically productive and sensitive areas available which meet industry's physical and economic requirements is the preferred site.

Standards and Guidelines

A. Siting of log transfer and log raft storage facilities within 300 feet of the mouths of anadromous fish streams, or in areas known to be important for fish spawning or rearing, is normally prohibited.

B. Log transfer and log raft storage facilities should be sited in weather protected waters with bottoms suitable for anchoring and with at least 20 acres for temporary log storage and log booming.

C. Log transfer facilities generally should be sited in proximity to at least five acres of relatively flat uplands. There should also be a body of water sufficient to provide a minimum of 60 lineal foot facility face.

D. To provide safe access to the log transfer facility and adjoining log sort yard, the facility should be sited where access roads to the facility can maintain a grade of 10% or less for trucks and 4% for specialized equipment.

E. Log transfer facilities should be sited along or adjacent to straits and channels or deep bays where currents may be strong enough to disperse sunken or floating wood debris. Siting log transfer facilities behind sills or other natural restrictions to tidal exchange should be avoided.

F. Sites for in-water storage and/or transfer of logs should be located in areas having the least productive intertidal and subtidal zones.

G. Log transfer facilities and log raft storage areas should not be sited on or adjacent to (i.e., near enough to effect) extensive tideflats, salt marshes, kelp or eelgrass beds, seaweed harvest areas or shellfish concentration areas.

H. Log rafting and storage facilities should be safety accessible to tug boats with log rafts at most tides and on most winter days.

I. Logs, log bundles or log rafts should be stored in areas where they will not ground at low tide. A minimum depth of 40 feet or deeper measured at Mean Lower Low water (MLLW) for log raft storage is preferred.

J. Site log transfer facilities to avoid bald eagle nests. No project construction or operation should be closer than 330 feet to any bald eagle nest tree.

Activity: Construction and Operation NAS Code: LT214

I. General Direction

The following guidelines apply to the construction and operation of log transfer facilities (LTF) and collateral upland facilities such as sort yards and upland log storage areas.

Standards and Guidelines

A. Log transfer facility should be designed to have the least environmental impact. Factors to be considered in selection of design alternatives include:

1. Economic practicality

2. Facility requirements

3. Physical site constraints

4. Timber volumes to be transferred (site usage and duration)

5. Total potential effects on biota, water quality (including biological productivity and sensitivity), visual quality, and

6. Other potential uses of the site and facility.

B. Fill structures shall be designed and con- structed to prevent erosion, pollution and structural displacement.

C. In-water construction, blasting and/or filling associated with LTF sites should be timed to limit adverse impacts to marine and estuarine fishery resources and avoid conflicts with other user groups.

D. The siting, design and operation of the LTF and contiguous collateral upland facilities shall utilize procedures and methodologies to control intertidal and submarine accumulations of bark.

E. Solid waste, including wood and other solid waste generated from the LTF, contiguous and other collateral facilities shall be routinely removed from the log transfer facilities and adjacent facilities and disposed of at an approved upland solid waste disposal site.

F. When accumulations exceed the threshold level, cleanup will occur at the discretion of the permitting agency(ies). The interim threshold bark accumulation level is describes as 100% coverage exceeding both 1 acre in size and a thickness greater than 10 cm (3.9 inches) at any point.

G. The speed of log bundles entering receiving waters should be the slowest practicable speed achievable. Decisions on the allowable transfer system that can be used will occur on site-specific basis during the permitting process.

H. The design, construction and operation of LTF's, sort yards and/or log storage yards shall utilize practicable procedures for control of surface water runoff from facilities.

I. The log transfer system and adjacent sort yard handling equipment shall be operated and maintained to minimize petroleum and lubrication products from entering waters.

J. Where feasible, preference must be given to onshore storage and barging of logs.

I. General Direction

Log Transfer Facilities (LTF) are monitored to assure permit compliance. Information obtained as a result of monitoring is used to determine results from activities associated with the construction, operation and maintenance of the facilities and to ensure that corrective action occurs, if appropriate. The level and type of monitoring is dependent on the type of facility.

Standards and Guidelines

A. Bark accumulations, oil sheen and surface runoff associated with the operation of log transfer facilities will be monitored. The regulatory agencies may, at their discretion, be responsible for some or all monitoring requirements.

B. Monitoring should be undertaken at all LTF sites. The level of monitoring and parameters to be monitored should be determined on a site-specific basis. A monitoring plan will be submitted to the regulatory agencies prior to operation of the LTF.

C. Monitoring of bark debris accumulation should occur prior to the operating season as a minimum requirement.

D. Elements that should be included in a monitoring program are site-specific and may include but not be limited to:

1. Permanent transects,

2. Measurements of areal extent, thickness and percent coverage bark debris,

E. Waters in the vicinity of an LTF shall be monitored during operations for the presence of a visible sheen.

1. Any observations shall be reported to the regulatory agencies.

F. Monitoring Upland Discharges: On a case-by-case basis, discharges of rainfall runoff from the log sorting and storage yard and discharges from any settling pond used to treat water may require monitoring to ensure compliance with State Water Quality Standards and the Clean Water Act.

G. Routine annual reports submitted to the regulatory agencies should include the following descriptive information:

1. Location of LTF. (402/404 permits require latitude and longitude; Forest Service traditionally uses legal descriptions).

2. Description of LTF, including transfer devices and sorting and storage areas.

3. Permit holder and/or operator of LTF.

4. Starting and ending dates of operation season (from first to last bundle), and number of operating days per season.

5. Gross volume in board feet (Scribner Sales) or number of bundles transferred during the operating season.

6. Monitoring data described in monitoring Guidelines.

Appendix G

Management Project Prescriptive Direction

Semiprimitive Nonmotorized

Description of the Management Area

Management emphasis is for providing nonmotorized semiprimitive recreation opportunities and activities such as hiking and cross-country skiing both on and off trails, backcountry camping, hunting, fishing, viewing wildlife and the use of non-motorized boats on lakes and streams in an area closed to motorized use. Such activities and opportunities are made available away from roads and trails which are open to motorized use and areas of concentrated development or human activity; and waterways generally used by motorized boats.

The area is characterized by a predominately natural or natural appearing environment. The area provides moderate to high probability to experience independence, closeness to nature, and self reliance in an environment that offers a high to moderate degree of challenge in traveling both cross country and on constructed trails or marked waterways. Evidence of past management and use, such as historical remains of early mining or logging may be present. These may or may not be visually subordinate to the surrounding landscape, but appear to have evolved to their present state through natural processes. Current resource management activities are not visually evident or are subordinate to the characteristic landscape.

Desired Conditions

** **Recreation:** Use is managed to maintain a high to moderate probability of experiencing isolation from the sights and sounds of human activity in an environment that offers challenge and risk, particularly in the use of nonmotorized methods of travel. Concentration of users is low but there is often evidence of other users. On-site regimentation and control of use is subtle. Developed sites are rustic and facilities are primarily for resource protection.
** **Visual:** All activities within the area are integrated in such a way that they are not evident to the casual observer. Landscape rehabilitation is used to restore existing landscapes to a desirable visual quality. Visual enhancement is aimed at increasing positive elements of the landscape to improve visual variety and to remove discordant elements.
** **Fish:** Emphasis is on maintaining naturally appearing riparian and stream habitat conditions.
** **Wildlife:** Emphasis is on maintaining naturally appearing habitat conditions and enhancing viewing opportunities.
** **Timber:** Vegetative cover is managed to appear in an unaltered state.
** **Soil and Water:** Land use activities are carried out in a manner which avoids adverse soil impacts and protects water quality.
** **Facilities:** Recreation cabins, shelters, tent platforms or pads and other structures may be located here and are designed to complement management of the area.
** **Transportation:** The transportation system within the area is primarily composed of trails and waterways. Other management activities requiring the development of non-system roads are located and designed to expand and enhance the semiprimitive recreation opportunities in the area. Aircraft access may occur.

** Fire: Natural and human caused fires are normally surpressed but may be allowed to burn to enhance wildlife habitat conditions.
** Insect and Disease: Integrated pest management principles are applied during project implementation to improve the health of the vegetative cover.

RESOURCE: Recreation

Activity: Recreation Use Administration NAS Code: AN122

I. General Direction - General Recreation Management and Operations

A. Manage for Semiprimitive Nonmotorized recreation opportunities and appropriate activities throughout the Prescription Area, unless specifically closed to public use.

B. Use of motorized equipment and use of explosives is permitted for construction and maintenance of facilities.

RESOURCE: Visuals

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Visual character of the area may be in an altered appearance, however; design activities to not be evident to the casual observer utilizing natural form, line and texture found in the environment.

Standards and Guidelines

1. Apply Management area-wide standards and guidelines for the Retention Visual Quality Objective.

B. Rehabilitate areas to a desirable visual character where conditions warrant.

Semiprimitive Motorized

Management emphasis provides Semiprimitive Motorized recreation opportunities and activities such as snowmobiling, high-clearance vehicle driving or use of ATV's and motorcycling on trails and primitive roads and areas designated appropriate for these activities; and the use of motorboats on remote lakes and streams and coastal areas. Such activities and opportunities are made available away from areas of concentrated development and human activity; and heavily used waterways, but commonly occur adjacent to saltwater coastlines where seasonal motorboat use is low to moderate.

The area is characterized by a predominately natural or natural appearing environment. The area provides moderate to high probability to experience independence, closeness to nature, and self reliance in an environment that offers a high to moderate degree of challenge in traveling and operating motorized vehicles or boats. Evidence of past management and use, such as historical remains of early mining, logging may be present. These may or may not be visually subordinate to the surrounding landscape, but appear to have evolved to their present state through natural processes. Current resource management activities are not visually evident or are subordinate to the characteristic landscape.

Desired Conditions

** **Cultural resources:** Sites are protected, available for study and may be interpreted on-site.
** **Recreation:** Use is managed to maintain a high to moderate probability of experiencing isolation from the sights and sounds of human activity in an environment that offers challenge and risk, particularly in the use of motorized vehicles or boats. Concentration of users is low but there is often evidence of other users. On-site regimentation and control of use is subtle. Developed sites are rustic and facilities are primarily for resource protection.
** **Visual:** All activities within the area are integrated in such a way that they are not normally evident to the casual observer. Landscape rehabilitation is used to restore existing landscapes to a desirable visual quality. Visual enhancement is aimed at increasing positive elements of the landscape to improve visual variety and to remove discordant elements.
** **Fish:** Emphasis is on maintaining naturally occurring riparian and stream habitat conditions.
** **Wildlife:** Emphasis is on maintaining naturally occurring habitat conditions and enhancing viewing opportunities.
** **Timber:** Silvicultural treatment is integrated with site and area development to provide healthy tree stands and vegetative diversity. Priority is given to maintaining or enhancing wildlife habitats and forage.
** **Soil and Water:** Land use activities are carried out in a manner which avoids adverse soil impacts and protects water quality.
** **Facilities:** A variety of recreation facilities such as recreation cabins or shelters may be located here and are designed to compliment management of the area.
** **Transportation:** The transportation system within the area provides opportunity for use of high-clearance vehicles, trailbikes and small motorboats

and access with aircraft. Other resource management activities requiring the development of roads are located and designed to expand and enhance the semiprimitive recreation opportunities within the area. Use of roads and trails may be seasonally regulated and use may be restricted to designated travel routes.

** **Fire:** Natural and human caused fires are normally surpressed but may be allowed to burn under controlled conditions to enhance wildlife habitat conditions.

** **Insect and Disease:** Integrated pest management principles are applied during project implementation to improve the health of the vegetative cover.

RESOURCE: Visuals

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Design activities to be subordinate to the characteristic landscape of the area.

Standards and Guidelines

1. Apply Management area-wide Standards and Guidelines for the Partial Retention Visual Quality Objective. This objective defines the maximum limit of allowable change to the visual character of the area; less visible evidence of activities is acceptable.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Develop and manage the transportation system to enhance motorized recreation opportunities in a predominantly natural appearing environment.

Standards and Guidelines

1. Limit the design standards of forest development roads to those commensurate with single use, low volume traffic (i.e., Traffic Service Level D).
2. Manage these roads to provide for the use of one or more of the following vehicle types:
   * High clearance vehicles.
   * All-terrain vehicles.
   * Snowmobiles
   * Motorcycles
3. Post signs informing the public that these roads are not intended for public travel by normal passenger cars.
4. Maintain only as necessary to provide passage of planned traffic and basic custodial care (i.e., Maintenance Level 2).

Wildlife Habitat Retention

This area consists of mature forest stands, classed as late forest succession, which provide habitat for mature timber dependent wildlife and fish species. The habitat features include mature and overmature trees in a multi-layered canopy, with standing dead and down material, and with a diversity and abundance of understory shrubs, forbs, and grasses.

Emphasis in this area is maintenance and enhancement of wildlife habitat and populations in their natural conditions. Included in this is the maintenance of the chemical, physical, and biological integrity of the mature timber areas.

This prescription may be applied to areas of the Forest which do not currently have desirable mature timber habitats but may have younger stands designated to become mature timber habitat in the future.

Desired Conditions

** **Cultural resources**: Interpretation of the natural environment and the cultural resources may be provided for the visitors when compatible with management objectives.
** **Recreation** use and activities are to meet the appropriate levels of social encounters and visitor impacts compatible with maintaining habitat conditions and wildlife population use of the area. Opportunities will exist for providing recreation users with a broad spectrum of opportunities including increased potential for encountering wildlife. Semi-primitive Nonmotorized and limited Semi-primitive motorized ROS classes will be the predominant classes of recreation opportunities.
** **Visual** The landscape will have a natural appearance; the predominant visual conditions will be II or III.
** **Wildlife and Fish** management will emphasize enhancement and maintenance of natural habitat conditions for wildife and fish species dependent on mature timber stands. This will result in the successful reproduction and overwintering of wildlife and fish populations of emphasis species. (Younger growth stands designated to become future mature timber stands may receive vegetative treatments to encourage earlier development of mature timber habitat characteristics).
** **Timber**: This area is not scheduled for timber harvesting. Vegetation will be managed consistent with other resource needs. Vegetative management will be limited to uneven-aged management in second growth and new forest stands to encourage rapid growth and early development of mature timber habitat characteristics.
** **Minerals**: Material sites will be located outside this area to the extent practicable. Mineral activities are regulated to attain compatibility with management objectives.
** **Facilities**. Developments requiring water access (docks, floats, boat ramps) should be located within the area where the least impact on resource values is expected to occur. Facilities will be allowed if compatible with management objectives.
** **Transportation**: roads, corridors, and Log Transfer Sites will be located outside of this prescription area to the extent practicable. If transportation

facilities must be located in the area, locate where the least impact is likely to occur.
** Subsistence use will be allowed to occur in accordance with Federal and State regulations. Opportunities for harvesting mature timber related resources (such as deer and furbearers) will be maintained.
** Soil and Water: Soil and water resources will evolve in natural mature timber condition.
** Insect and Disease: Natural endemic levels of insects and diseases will occur in this prescription area.

RESOURCE: Visuals

Activity: Visual Resource Preparation NAS Code: AV11

I. General Direction - Visual Quality Objective

A. Apply adopted Visual Quality Objectives as a minimum. MA wide standards and guidelines for Retention and Partial Retention are consistent with the emphasis of this prescription.

RESOURCE: Wildlife

Activity: Wildlife Habitat Planning NAS Code: CW112

I. General Direction

A. Younger growth stands designated to become future mature timber stands may receive vegetative treatments to encourage earlier development of mature timber habitat characteristics.

Activity: Wildlife Habitat Monitoring NAS Code: CW121

I. General Direction

A. Monitor the acreage of mature timber habitat lost due to catastrophic events, roads, minerals activities, etc. Evaluate the impacts of the lost acreage on the ability to attain wildlife objectives.

RESOURCE: Timber

Activity: Timber Resource Planning NAS Code: ET112

I. General Direction

1. Generally there will be no harvest of timber other than to meet personal use (subsistence). This harvest will take only occasional scattered trees and beach logs and is not to alter the mature timber character.
2. Stabilize beach fringe areas by allowing the areas suffering blowdown to reach equilibrium to protect remaining wildlife habitat.
3. Salvage of catastrophic blowdown and insect and disease killed timber is permissable.
4. Any timber harvest associated with salvage of blowdown or insect and disease killed timber is not chargeable to the allowable sale quantity.

RESOURCE: Soil and Water

Activity: Watershed Resource Improvements NAS Code: FW2

I. General Direction

A. Undertake watershed improvements where deteriorated soil and hydrologic conditions create a threat to the values for which the mature timber habitat is managed.

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) NAS Code: JL122

I. General Direction

A. Permit development activities compatible with prescription area objectives.

RESOURCE: Facilities

Activity: Facilities Construction NAS Code: LF22

I. General Direction

A. All facilities in this area should fall under the VQO settings: Retention or Partial Retention.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Designate road corridors, where necessary, to allow access for planned management activities in this or other management areas.
Standards and Guidelines

1. Consider impacts to fish and wildlife and enforcement costs of road closure program.
2. Locate, design and construct roads to minimize adverse effects on fish and wildlife. Road location and design criteria shall be developed through the interdisciplinary team process.
3. If need is determined during project interdisciplinary team review, roads may be closed, either seasonally or yearlong, to minimize adverse effects on fish and wildlife.

The primary purpose of this area is to maintain optimum habitat for fish and riparian dependent wildlife species within drainages that produce high numbers of pink or chum salmon or which provide significant sportfishing opportunities. It includes the main stem stream channel and lakes as well as the floodplain and the adjacent low gradient areas which have a high probability of containing small rearing tributaries and other unidentified streams. These areas are primarily characterized by aquatic and riparian ecosystems with distinctive resource values and characteristics.

This emphasis area applies only to designated Priority 1 (High Value) watersheds. The emphasis area is defined by a combination of channel type and landform information. As a minimum, this area includes a 100 hundred foot horizontal distance from fish streams (B, C, D, or E channel types) and lake shores. The area also includes adjacent land areas that conform to the Alluvial Fans Landtype, the Low Outwash Plains Landtype, the Braided Streams Landtype, or the High Outwash Plains Landtype. These areas generally contain the large majority of high quality anadromous fish habitat.

This emphasis area is not synonymous with "Aquatic Habitat Management Unit" as defined by the Management Area-wide Standards and Guidelines.

Desired Conditions

** **Recreation** opportunities abound; however, actual use must be managed to preserve the habitat quality of the riparian area. Recreation developments should generally be located in other areas, unless the use is compatible and cannot practicably be located outside of riparian areas. Activities are designed to harmonize with the appropriate designated ROS setting and purpose of the area. Primitive I, Primitive II, Semi-primitive Nonmotorized and Semi-primitive Motorized opportunities.
** **Visual** A natural appearing landscape will be maintained, the predominant visual conditions will be II or III.
** **Fish and Wildlife** resources, including their protection, rehabilitation, and enhancement will be the primary emphasis in this prescription area. Other resource management activities should assure that optimum stream conditions are maintained and that adequate vegetative conditions are available to provide high quality habitat and travel corridors for riparian dependent wildlife species.
** **Timber**: Vegetative management actions will be limited and will occur only when consistent with the protection of fish and wildlife resources. Silvicultural activities will emphasize the development or maintenance of fish and wildlife habitat.
** **Soil and water**: Soil and water protective measures are applied to maintain or improve water conditions or fish habitat.
** **Mineral** resource development will often include special mitigating conditions due to the sensitivity of the area. Mineral material sites will normally be located outside this area unless fisheries habitat quality objectives can be met. Minerals activities will be regulated to attain compatibility with management objectives. Maintain desired water quality by

controlling effluent, solids, toxic cehmicals, and/or heavy metals, that may result from mineral exploration or mining activities.
** **Land** uses, such as special use, should generally be located in other areas, unless the use is compatible and cannot be located outside of riparian areas.
** **Facilities** should generally be located in other areas, unless the use is compatible and cannot be located outside of riparian areas.
** **Transportation** developments should be located outside of the area, to the extent practicable. Developments should not impair the production of anadromous fish or of resident sportfish populations. Road corridors should also avoid heavily used wildlife areas.
** **Subsistence** use will be allowed to occur in a manner consistent with management objectives for the area and in accordance with applicable Federal and State regulations. Opportunities will be maintained for harvesting riparian related resources, including both fish and wildlife species.

RESOURCE: Recreation

Activity: Recreation Use Administration **NAS Code:** AN122

I. **General Direction** - General Recreation Management and Operations

A. Manage recreation use to minimize/avoid the adverse effects of recreation activities on wildlife and fish resources and habitat.

B. Provide for inventoried ROS opportunities and appropriate activities throughout the Prescription Area, unless specifically closed to public use. Where the ROS setting is changed by project implementation manage the recreation resource in accordance with the created ROS conditions.

Standards and Guidelines

1. Locate, design and operate only those recreation facilities which are necessary to manage existing public use of the water and shoreline areas (i.e., boat or float plane docks, lauching ramps and associated access roads and trails). Locate parking, sanitation and other recreation facilities outside the Prescription Area where practical. Design all facilities within the Prescription Area to avoid adverse effects on riparian shorelines and water quality.

RESOURCE: Visuals

Activity: Visual Resource Operations **NAS Code:** AV1

I. **General Direction**

A. A variety of visual conditions may exist but a natural appearing landscape will generally be maintained.

Standards and Guidelines

1. Visual Quality Objectives may range from Retention to Partial Retention (Refer to MA-wide standards and guidelines).

RESOURCE: Fish

Activity: Fish Habitat Planning **NAS Code:** CF112

I. **General Direction**

A. Emphasize the protection and enhancement of fish habitat and populations. Management activities should not result in any decrease in anadromous fish, or high value resident sport fish, habitat capability.

B. Silviculture prescriptions should insure future large woody debris (LWD) sources to maintain/enhance fisheries.

RESOURCE: Wildlife

Activity: Wildlife Habitat Planning NAS Code: CW112

I. General Direction

A. Coordinate management activities with the needs of wildlife.
Standards and Guidelines
1. Use the habitat needs of MIS to help identify project locations.
2. Allow for the migration and movement of wildlife along riparian areas.

B. Coordinate vegetation management to emphasize the needs of wildlife.
Standards and Guidelines
1. Utilize silvicultural techniques which prolong understory forb and shrub production.
2. Provide habitat for cavity nesting wildlife species.
* Favor saving snags away from roads to reduce loss from firewood gathering activity.

C. Coordinate road management to emphasize the needs of wildlife.
Standards and Guidelines
1. Locate and design roads to minimize human disturbance to wildlife, with particular emphasis given to brown bear habitat and deer wintering areas.
2. Utilize road management including yearlong or seasonal closures to reduce human disturbance on wildlife. Particular emphasis needs to be given to road management in important brown bear riparian habitats and deer wintering areas.

RESOURCE: Timber

Activity: Timber Resource Planning NAS Code: ET112

I. General Direction

A. Suitable forest land is available for harvest and is included in the allowable sale quantity calculation.
B. To the extent practical, limit timber harvest activities within this emphasis area.
C. Silvicultural activities will emphasize the development or maintenance of fish & wildlife habitat.

Activity: Timber Resource Coordination NAS Code: ET113

I. General Direction

A. Emphasize fisheries and wildlife objectives in project design, analysis, and development of NEPA documents for timber activities.

B. Prioritize K-V funds for fish and wildlife habitat improvement projects in the Sale Area Improvement Plan.

Activity: Timber Sale Preparation NAS Code: ET114

I. General Direction

A. Locate and design timber harvest units to insure that fish habitat, wildlife habitat, and water quality are protected.

B. Utilize nonstandard harvest methods, if necessary, to meet fish and wildlife habitat objectives. These methods may include, but are not limited to, single tree selection, group selection, and strip harvest.

Standards and Guidelines

1. Where strip clearcutting is prescribed, leave strips shall have a minimum width of 300 horizontal feet.

C. Minimize soil and understory vegetation disturbance.

Standards and Guidelines

1. Require low ground pressure yarding systems on wetter soils.
2. Do not allow yarding through areas of understory vegetation that have been undisturbed by tree felling operations.

Activity: Timber Stand Improvement NAS Code: ET25

I. General Direction

A. Precommercially thin second growth stands to increase forage production while providing some denser cover.

Standards and Guidelines

1. Thin to an average tree spacing between 16-20 feet.
2. Maintain small (one-half acre or less) unthinned clumps of healthy trees.

B. Provide corridors for wildlife movement in thinned second growth stands.

Standards and Guidelines

1. Designate corridors of approximately 50 feet in width.
2. Lop and scatter all slash to lie within 2 feet of the ground within designated corridors.

C. Maintain approximately 10 percent of second growth stands in openings.

Standards and Guidelines

1. On initial thinning, create or maintain openings of one-half acre or less in approximately 10% of the stand.
2. Lop and scatter all slash to lie within 2 feet of the ground within openings.

RESOURCE: Watershed

Activity: Watershed Resource Planning NAS Code: FW112

I. General Direction

A. Manage activities to meet the maximum requirements to protect water quality from degradation and to protect the aquatic and terrestrial riparian habitats, channel and streambanks, and promote floodplain stability.

Standards and Guidelines

1. Maintain and improve soil and water quality.
2. Apply Process BMPs to avoid the adverse effects from nearby land disturbance activities.
3. Monitor soil disturbance and water quality on a sample bases for management activities that disturb the soil surface to mineral material and removes vegetation.
4. Avoid the long and short-term adverse impacts to soil and water resources associated with the occupancy and modification of floodplains.

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) NAS Code: JL122

I. General Direction

A. Permit only those activities which are dependent upon riparian resources and do not significantly reduce the capability of the area to: (1) maintain or enhance dependent fish or wildlife habitat, or (2) protect water quality.

Standards and Guidelines

1. Analyze each new proposal on a case-by-case basis, using an interdisciplinary process, to determine probable effects.
2. Apply Managemetn Area-wide standards and guidelines for transportation operations, when granting new rights-of-way.

RESOURCE: Facilities

Activity: Facilities Improvements NAS Code: LF2

I. General Direction

A. Permit only those facilities which do not significantly reduce the capability of the area to maintain fish or wildlife habitat or water quality.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Locate, design and construct roads to minimize adverse effects on wildlife and fish habitat and populations.

B. If need is determined, roads may be closed either seasonally or year long, to minimize adverse effects on fish and wildlife.

Management decisions give equal emphasis for wildlife and visual objectives with secondary consideration for timber. These lands are most often in the foreground to middleground distance zones, and are viewed from a travel corridor, marine transportation route, or an area of moderate recreation use. All productive forest lands that are available may be scheduled for harvest.

Desired Conditions

** **Cultural** resource examination will be conducted prior to road construction or timber harvest to provide reasonable assurance that potential cultural resource values are discovered. Precise survey levels are to be determined on a case-by-case basis, taking into account the environmental characteristics of the area, conditions, type of impacting activity, and the kinds of resources that might be encountered.
** **Recreation** use and activities are managed to be compatible with the area prescription, ROS setting and purpose of the area. Semi-primitive Motorized, Roaded Modified and Roaded Natural will predominate.
** **Visual** quality will be emphasized along with Wildlife unless in direct conflict with wildlife objectives. In that case wildlife objectives will take precedence. Visual conditions III or IV will generally result from implementation of this prescription. Depending upon where the prescription is applied, it may or may not comply with the adopted VQO's for the affected areas.
** **Wildlife** and visual resource concerns are shared. Habitat conditions are provided for most MIS, with an emphasis on Sitka black-tailed deer winter habitat. Appropriate silvicultural activities will be used to maintain a wide variety of vegetative conditions with emphasis on late successional stages.
** **Fish**: Areas adjacent to important fish habitat will be protected so that no adverse affects result from management activities.
** **Timber**: Timber management may occur, but is managed, consistent with an emphasis on wildlife and visual quality. Silvicultural prescriptions may include both even aged and uneven aged timber management. Silvicultural treatment is integrated with site and area development to provide healthy stands of trees, vegetative diversity, and forage production for wildlife. Management activities will not dominate the seen area, but will work with existing form, line, color and texture found in the landscape.
** **Soil and Water** consideration will be provided through Best Management Practices. The emphasis will be to maintain soil cover, minimize slope failure, and reduce the degree of risk and potential affects from mass wasting associated with timber harvest and road construction.
** **Transportation management**: The location of the transportation network will focus on maintaining wildlife values and their habitats while providing access for management activities. The design of the road system will incorporate and enhance appropriate motorized and/or nonmotorized recreation opportunities.
** **Subsistence use** will be allowed to occur in accordance with Federal and State Regulations. Management activities will be compatible with subsistence uses.
** **Minerals**: Forest lands are open to mineral entry. Access will be coordinated with timber sale road location when practicable.
** **Facilities**: Permanent administrative facilities will be constructed to be compatible with the management area objective.
** **Insect and Disease**: Maintain the health of the forest by applying integrated pest management principles in project design and implementation.



RESOURCE: Recreation

Activity: Recreation Use Administration **NAS Code:** AN122

I. **General Direction** - Recreation Settings

A. Provide Semi-Primitive to Roaded Natural recreational opportunities.

RESOURCE: Visuals

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction - Visual Quality Objective

A. Activities will generally be evident and will often dominate the landscape. Where possible, blend activities into the natural landscape. Incorporate forms, lines, colors, and textures found in the natural landscape when designing activities.

Standard and Guidelines
Regardless of the applicable adopted VQO's, apply area-wide standard and guidelines for the Modification or, where possible, the Partial Retention VQO. Apply Partial Retentin standards and guidelines to harvest unit adjacent to the arterial road corridor. Consequently, adopted VQO direction will not necessarily be met except where this prescription is applied to areas with Maximum Modification adopted VQO's.

RESOURCE: Wildlife

Activity: Wildlife Habitat Planning **NAS Code:** CW112

I. **General Direction**

A. Coordinate vegetative management to emphasize needs of wildlife.
Standards and Guidelines

1. Use the habitat needs of Management Indicator Species (MIS), emphasizing Sitka black-tailed deer winter habitat requirements, to help identify the location, optimum size and layout of cutting units in a particular area.

2. Allow for the elevational migration of wildlife.

3. Use silvicultural techniques which establish and prolong understory forb and shrub production. Such techniques can include prescribed burning, precommercial thinning, permanent canopy gaps, and uneven-aged management.

4. Ensure that leave strips are windfirm, considering site specific conditions such as soils, local wind patterns, minimum 3-tree height rule, and other relevant factors.

B. Coordinate road management to emphasize the needs of wildlife.
Standards and Guidelines

1. Utilize road management including yearlong or seasonal closures to reduce human disturbance on wildlife with particular emphasis given to important deer wintering areas.

RESOURCE: Timber

Activity: Timber Resource Planning NAS Code: ET112

I. General Direction

A. Suitable forested land is available for harvest and is included in the allowable sale quantity calculation.

B. To the extent practical, limit timber harvst activities within this emphasis area.

C. Limit clearcut harvest unit size to about 40 acres.

Activity: Timber Resource Coordination NAS Code: ET113

I. General Direction

A. Emphasize wildlife and visual quality objectives in project design, analysis, and development of NEPA documents for timber activities.

B. Prioritize K-V funds for wildlife habitat and visual quality improvement projects in the Sale Area Improvement Plan.

Activity: Timber Sale Preparation NAS Code: ET114

I. General Direction

A. Location and design of timber harvest activities will consider wildlife habitat and visual quality objectives. This can be accomplished with both even-aged and uneven-aged silvicultural systems, although uneven-aged is the predominant harvest method.

1. Design travel corridors to meet elevational migration of wildlife.
2. Maintain standing mature forest to provide snow intercept and wildlife movement corridors until second growth stands provide these needs.

B. Wherever possible, retain more hard snags than specified in the Forest plan, and preferably in small groupings.

C. Retain areas of large, downed, woody debris within cutting areas to provide hiding cover for large animals.

D. Evaluate commercial thinning opportunities in second growth stands in the prescription area for enhancing timber growth and development while improving habitat conditions for wildlife. The emphasis for all commercial thinning opportunities in this area should be to hasten the recovery of mature forest habitat for wildlife emphasis.

Activity: Reforestation **NAS Code:** ET24

I. General Direction

A. Special reforestation techniques may be required to establish or extend deciduous vegetation in the early successional stages following timber harvest for wildlife habitat enhancement.

Standards and Guidelines

1. Prescribed burning may be used for site preparation to delay natural coniferous regeneration.
2. Delay of regeneration of the commercial forest type should not extend more than 10 years.

Activity: Timber Stand Improvement **NAS Code:** ET25

I. General Direction

A. Precommercially thin second growth stands to increase forage production while providing some denser cover.

Standards and Guidelines

1. Prioritize precommercial thinning in stands by wildlife habitat needs and stand site index.
2. Take animal damage control measures only in extreme problem areas.
3. Thin to an average tree spacing between 16-20 feet.
4. Maintain small (one-half acre or less) unthinned clumps of healthy trees.

B. Provide corridors for wildlife movement in thinned second growth stands.

Standards and Guidelines

1. Designate corridors of approximately 50 feet in width.
2. Lop and scatter all slash to lie within 2 feet of the ground within designated corridors.

C. Maintain approximately 10 percent of second growth stands in openings.

Standards and Guidelines

1. On initial thinning, create or maintain openings of one-half acre or less in approximately 10% of the stand.
2. Lop and scatter all slash to lie within 2 feet of the ground within openings.

MATRIX CODE: 17-E-Soil and Water

Activity: Soil Inventory NAS Code: FW1111

I. General Direction

A. Apply base-line soil, water and channel type inventory standards where it is determined that present inventories are not applicable for project planning.

Activity: Watershed Resource Planning NAS Code: FW112

I. General Direction

A. Delineate on appropriate project maps the location of soil and water protection areas to insure their recognition, proper consideration, and protection on the sale area.

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) NAS Code: JL122

I. General Direction

A. Permit only those activities compatible with prescription area objectives.

Standards and Guidelines

1. Permit only activities which will encourage, or at least not interfere with, emphasized wildlife habitat or species.
2. Permit only activities which will be compatible with a Partial Retention VQO.

Activity: Landline Location and Maintenance NAS Code: JL231, JL24

I. General Direction

A. Provide adequate land line marking for Forest Service contractors.

Standards and Guidelines

1. Prior to Forest Service management activities, survey, mark, and post adjacent property lines, to Forest Service standards, where there is a risk of tresspass.

RESOURCE: Facilities

Activity: Facilities Improvements NAS Code: LF2

I. General Direction

A. Allow construction of permanent administrative facilities only where compatible with wildlife and visual quality objectives.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Develop and manage the transportation system to provide access while meeting wildlife and visual quality objectives.

Standards and Guidelines

1. Locate, design and construct roads to minimize adverse effects on wildlife and visual resources.
2. If need is determined during project interdisciplinary team review, roads may be closed, either seasonally or yearlong, to minimize adverse effects on fish and wildlife.
3. Provide recreational access where appropriate.

Description of the Management Area

Management emphasis is for a combination of timber, fish and wildlife, recreation, and visual opportunities. Management decisions are based primarily on timber objectives. Consideration for fish, wildlife, recreation and visual needs are secondary. Where wildlife and recreation or visual objectives conflict, wildlife will prevail. Wildlife species which benefit from second growth habitat are red squirrel, lontailed vole, and orange-crowned warbler. As a rule, these lands are in low to moderate areas of public use in the middleground distance zone or seen from moderately sensitive travel routes.

Desired Conditions

** **Cultural resource:** Examinations are conducted prior to road construction or timber harvest to provide reasonable assurance that potential cultural resource values are discovered. Discovered cultural-historic-religious sites are protected.
** **Recreation:** ROS managed/designed to harmonize with timber, wildlife, fish and visual objectives. Semi-primative motorized, roaded natural, and roaded modified recreation opportunities can be provided.
** **Visual:** Management activities may noticeably alter the landscape. Activities may dominate the seen area, although they will be designed for consideration of existing form, line, and texture found in the landscape. Visual conditions IV or V will result from the implementation of this prescription which, depending upon the locations to which it is applied, might or might not comply with the adapted VQO's for the affected areas.
** **Fish:** Management activities will be designed to maintain or improve fish habitat.
** **Subsistence:** Subsistence use will be allowed in accordance with applicable Federal and State regulations.
** **Wildlife:** A wide variety of vegetative conditions, including early, middle, and late successional stages will provide a full range of wildlife habitat conditions.
** **Timber:** Vegetative management is integrated with site and area development to provide healthy tree stands, vegetative diversity, and forage production for wildlife populations. Silvicultural prescriptions will include both even-aged and uneven-aged silvicultural management.
** **Soil and Water:** Emphasis will be to maintain soil cover, minimize slope failure, and reduce the degree of risk and potential affects from mass wasting resulting from timber harvest and road construction.
** **Minerals:** Exploration will be encouraged. Access will be coordinated with timber sale road location when practicable.
** **Facilities:** Permanent administrative facilities will be constructed to be compatible with the management area objective.
** **Transportation:** All suitable forested lands will eventually be accessed in association with appropriate timber harvest activities. The location of the transportation network will insure the maintenance or enhancement of wildlife habitat values.
** **Fire:** Prescribed fire may be used for silviculural site preparation, wildlife habitat improvement, and slash reduction.

** **Insect and Disease:** Maintain the health of the forest by applying integrated pest management principles in project design and implementation.

RESOURCE: Recreation

Activity: Recreation Use Administration NAS Code: AN122

I. General Direction - Recreation Settings

A. Provide a spectrum of outdoor recreation opportunities in accordance with timber, wildlife, fish and visual objectives.

Standards and Guidelines

1. Manage recreation use in a manner that is compatable with the emphasis of the area.

2. Manage the new setting(s) in accordance with the scheduled activities. Maintain the capability of the area to provide appropriate quality recreation opportunities on a sustained basis.

RESOURCE: Visuals

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Activities may dominate seen areas adjacent to travel routes or use areas. Design activities to incorporate form, line and texture found in the characteristic landscape.

Standards and Guidelines

1. Regardless of the applicable adopted VQO's, apply area-wide standards and guidelines for the Modification or Maximum Modification visual quality objective.

RESOURCE: Wildlife

Activity: Wildlife Habitat Planning NAS Code: CW112

I. General Direction

A. Where no significant conflict with timber management objectives occurs, coordinate vegetative management to incorporate the needs of wildlife.

Standards and Guidelines

1. Use the habitat needs of MIS, emphasizing Sitka Black-tailed Deer winter habitat requirements, to help identify the location, optimum size and layout of cutting units in a particular area.
2. Allow for the elevational migration of wildlife.
3. Use silvicultural techniques which establish and prolong understory forb and shrub production. Such techniques can

include prescribed burning, precommercial thinning, and permanent canopy gaps.

4. Ensure that leave strips are windfirm, considering site specific conditions such as soils, local wind patterns, minimum 3-tree height rule, and other relevant factors.

B. Coordinate road management to emphasize the needs of fish and wildlife.

RESOURCE: Timber

Activity: Timber Resource Planning **NAS Code:** ET112

I. General Direction

A. Suitable forested land is available for harvest and is included in the allowable sale quantity calculation.

Activity: Timber Sale Preparation **NAS Code:** ET114

I. General Direction

A. Where no significant conflict with timber management objectives occurs, locate and design timber harvest units with consideration for wildlife habitat and visual quality objectives. This can be accomplished with both even-aged and uneven-aged silvicultural prescriptions, although even-aged is the predominant harvest method.

Standards and Guidelines

1. Design leave strips to meet elevational migration of wildlife.
2. Design cutting unit size to provide for future forested habitat needs for wildlife.
3. In partial cuts, maintain the tree species mix favorable for wildlife objectives.

B. The established limits do not apply to the size of areas harvested as a result of natural catastrophic conditions, such as insect and disease attack, or windthrow.

Activity: Reforestation **NAS Code:** ET24

I. General Direction

A. Special reforestation techniques may be required to establish deciduous vegetation for wildlife habitat in the early successional stages following timber harvest.

Standards and Guidelines

1. Prescribed burning may be used for site preparation to delay natural coniferous regeneration when applied for wildlife habitat improvement.
2. Delay of regeneration of the commercial forest type should not extend more than 5 years.

Activity: Timber Stand Improvement NAS Code: ET25

I. General Direction

A. Precommercially thin managed stands to improve stand characteristics for timber management objectives.
Standards and Guidelines
1. Thin to an average tree spacing between 12-15 feet. In areas identified as important wildlife habitat, increase tree spacing to improve wildlife browse production.
2. Prioritize precommercial thinning by site index. Thin stands with highest site index first.
3. Take animal damage control measures to reduce damage to crop trees.

B. Provide corridors for wildlife movement in thinned second growth stands.
Standards and Guidelines
1. Designate corridors of approximately 50 feet in width.
2. Lop and scatter all slash to lie within 2 feet of the ground within designated corridors.

RESOURCE: Soil and Water

Activity: Soil Inventory NAS Code: FW1111

I. General Direction

A. Apply base line soil, water and channel type inventory standards where it is determined that present inventories are not applicable for project planning.

Activity: Watershed Resource Planning NAS Code: FW112

II. General Direction

A. Manage riparian management areas to protect water quality to meet by preventing degradation of the aquatic and terrestrial riparian habitats, channel and streambanks, and promoting floodplain stability.

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) NAS Code: JL122

I. General Direction

A. Permit only those uses which are compatible with management area objectives.

Activity: Landline Location and Maintenance NAS Code: JL231, JL24

I. General Direction

A. Provide adequate land line marking for Forest Service contractors.
Standards and Guidelines
1. Prior to Forest Service management activities, survey, mark, and post adjacent property lines, to Forest Service standards, where there is a risk of trespass.

RESOURCE: Transportation

Activity: Transportation Operations **NAS Code:** LT1

I. General Direction

A. Develop and manage the transportation system to provide cost efficient access while meeting wildlife and visual quality objectives.
Standards and Guidelines
1. If need is determined, roads may be closed, either seasonally or year long, to minimize adverse effects on fish and wildlife.
2. Provide recreational access.

RESOURCE: Insect and Disease

Activity: FPM Suppression Federal Lands **NAS Code:** QC124-1

I. General Direction

A. Hemlock Dwarf Mistletoe Control
Standards and Guidelines
1. Where hemlock dwarf mistletoe interferes with wildlife/visual/timber objectives, the spread of this disease should be controlled by:
   * Killing infected residuals at the time of harvest or precommercial thinning.
   * Minimizing the number of infected trees on boundaries of harvest units.
   * Removing infected overstory western hemlock during partial cutting or group selection.

B. Suppression of other insects or diseases.
Standards and Guidelines
1. Where bole fluting of western hemlock threatens resource objectives, such trees should be removed during thinning, partial cutting, or group selection activities.
2. Where other pests threaten resource objectives, they should be aggressively suppressed using the most cost-effective strategies, as recommended by Pest Management specialists.

Timber Production

The primary emphasis of this area is timber production. The primary objective is to maintain and promote industrial wood production by intensive vegetative management with sound silvicultural techniques. These lands will be managed to advance conditions favorable for the development of the timber resource and for maximum long-term timber production.

Management Implications

** **Cultural resource:** Examination and mitigation will be conducted prior to development activities to provide reasonable assurance that potential cultural resource values are protected.
** **Recreation:** ROS settings are designed to harmonize with the purpose of the management area. Semi-primative motorized, roaded natural, and roaded modified recreation opportunities can be provided.
** **Visual:** The characteristic landscape will be dominated by timber harvest activities. Harvest units will be designed with consideration for existing form, line, and texture found in the landscape. Visual conditions IV or V will result from implementation of this prescription which, depending upon the locations to which it is applied, might or might not comply with the adopted VQO's for the affected areas.
** **Fish:** Management activities will be designed to maintain or improve fish habitat.
** **Subsistence:** Subsistence use will be allowed in accordance with applicable Federal and State regulations.
** **Wildlife:** A wide variety of vegetative conditions, including early, middle, and late successional stages will provide a full range of wildlife habitat conditions.
** **Timber:** Intensive vegetative management is integrated with site and area development to provide healthy tree stands. Silvicultural prescriptions may include both even aged and uneven aged timber harvest methods, although clearcutting will be the dominate method applied.
** **Soil and Water:** Emphasis will be to maintain soil cover, minimize slope failure, and reduce the degree of risk and potential affects from mass wasting resulting from timber harvest and road construction.
** **Minerals:** Lands are open to mineral entry. Access will be coordinated with timber sale road location when practicable.
** **Facilities:** Permanent administrative facilities will be constructed to be compatible with the management area objective.
** **Transportation:** All suitable forested lands will eventually be accessed in association with appropriate timber harvest activities while incorporating wildlife considerations of the management area.
** Fire: Appropriate suppression measures will be utilized. Prescribed fire may be used for silvicultural site preparation, wildlife habitat improvement, and slash hazard reduction.
** **Insect and Disease:** Maintain the health of the forest by applying integrated pest management principles in project design and implementation.

RESOURCE: Recreation

Activity: Recreation Use Administration NAS Code: AN122

I. General Direction - Recreation Settings

A. Continue to provide the spectrum of outdoor recreation opportunities in accordance with the inherent capabilities of the Management Area.

Standards and Guidelines

1. Provide the inherent recreation settings and opportunities until scheduled activities and practices cause a change in the ROS setting(s).

2. In locations where scheduled activties change the recreation setting(s), manage the new setting(s) in accordance with the appropriate ROS guidelines. Maintain the capability of the Management Area to provide appropriate quality recreation opportunities on a sustained basis.

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Timber management activities will dominate the visual character of the landscape.

Standards and Guidelines

1. Regardless of the applicable adopted VQO's, apply area-wide standards and guidelines for the Maximum Modification Visual Quality Objective. This objective defines the maximum limit of allowable change to the visual character of the area; less visible evidence of activities is acceptable.

RESOURCE: Wildlife

Activity: Wildlife Habitat Planning NAS Code: CW112

I. General Direction

A. Coordinate vegetation management to consider the needs of wildlife within the overall objectives of the Prescription Area.

Standards and Guidelines

1. Use the habitat needs of MIS, emphasizing Sitka black-tailed deer winter habitat requirements, to evaluate opportunities for wildlife.
2. Provide for windfirm boundaries, considering site specific conditions such as soils, local wind patterns, minimum 3-tree height rule, and other relevant factors.

B. Coordinate road management with the needs of wildlife where practical.

RESOURCE: Timber

Activity: Timber Resource Planning NAS Code: ET112

I. General Direction

A. Suitable forest land is available for harvest and is included in the allowable sale quantity calculation.

Activity: Timber Resource Coordination NAS Code: ET113

I. General Direction

A. Project design, analysis, and development of NEPA documents will emphasize timber management objectives as well as other resource considerations deemed appropriate by the responsible official.

B. The Sale Area Improvement Plan will coordinate K-V funds for timber and other resource improvement projects. Priority will be timber management objectives.

Activity: Timber Sale Preparation NAS Code: ET114

I. General Direction

A. Locate and design timber harvest activities primarily to meet timber management objectives. Integration of other resources objectives will be included if they do not have a significant adverse impact on timber management goals. Clearcutting is the predominant harvest method.

B. The established limits and exceptions do not apply to the size of areas harvested as a result of natural catastrophic conditions, such as insect and disease attack, or windthrow.

D. Created openings will be adequately stocked with desirable tree species, which are approximately 5 feet in height, before the area will no longer be considered an opening.

Activity: Timber Stand Improvement **NAS Code:** ET25

I. **General Direction**

A. Precommercially thin managed stands to improve stand characteristics for timber production objectives.
Standards and Guidelines
1. Thin to an average tree spacing between 12-15 feet.
2. Take animal damage control measures to minimize damage to crop trees.
3. Prioritize precommercial thinning by site index. Thin stands with the highest site index first.

RESOURCE: Soil and Water

Activity: Soil Inventory **NAS Code:** FW1111

I. **General Direction**

A. Apply base line soil, water and channel type inventory standards where it is determined that present inventories are not applicable for project planning.

Activity: Watershed Resource Planning **NAS Code:** FW112

I. **General Direction**

A. Manage riparian management areas to protect water quality by preventing degradation of the aquatic and terrestrial riparian habitats, channel and streambanks, and promoting floodplain stability.
Standards and Guidelines

Activity: Watershed Resources Monitoring **NAS Code:** FW121

I. **General Direction**

A. Monitor soil and water resources with relation to effect of roading and logging with applied BMPs.
Standards and Guidelines
1. Monitor soil disturbance and water quality on a sample basis for management activities that disturb the soil surface to mineral material and removes vegetation to determine effectiveness of BMPs.

Activity: Watershed Resource Improvements **NAS Code:** FW2

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) **NAS Code:** JL122

I. **General Direction**

A. Permit only those uses which are compatible with management area objectives.

Activity: Landline Location and Maintenance **NAS Code:** JL231, JL24

I. **General Direction**

A. Provide adequate land line marking for Forest Service contractors.
Standards and Guidelines
1. Prior to Forest Service management activities, survey, mark, and post adjacent property lines, to Forest Service standards, where there is risk of tresspass.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Develop and manage the transportation system to provide cost efficient access for land management activities.

Standards and Guidelines

1. If need is determined, roads may be closed, either seasonally or yearlong, to minimize adverse effects on fish and wildlife.
2. Provide recreational access where appropriate.

RESOURCE: Insect and Disease

Activity: FPM Suppression Federal Lands NAS Code: QC124-1

I. General Direction

A. Hemlock Dwarf Mistletoe Control

Standards and Guidelines

1. Where hemlock dwarf mistletoe interfers with resource objectives, the spread of this disease should be controlled by:
   * Killing infected residuals at the time of harvest or precommercial thinning.
   * Minimizing the number of infected trees on boundaries of harvest units.
   * Removing infected overstory hemlock during partial cutting or group selection.

B. Suppression of other insects or diseases.

Standards and Guidelines

1. Where bole fluting of hemlock threatens resource objectives, such trees should be removed during thinning, partial cutting, or group selection activities.
2. Where dead and dying stands of Alaska-cedar threaten resource objectives, such trees can be salvaged. Alaska-cedar can be managed without the threat of spreading this disorder to new sites because a contagious organism is not the primary cause.
3. Where other pests threaten resource objectives, they should be aggressively suppressed using the most cost-effective strategies, as recommended by Pest Management specialists.

Road Corridors

Management Emphasis

The primary management emphasis of the prescription is to administer access facilities.

Area Description

These areas include roads, trails and related facilities and proposed transportation and rights-of-way corridors necessary to accommodate use for public, administrative and resource management access. These areas are managed to accommodate public and forest management transportation needs.

Sites have significant improvements located within a generally compact area while corridors are by nature linear and have limited variable width. Sites and corridors include the land directly under and immediately adjacent to the facilities. Corridors are limited in width and generally will be delineated by the clearing limits of the traveled way.

Management Goals

The goal with this prescription is to provide necessary access between 2 or more locations within the National Forest or jointly with cooperators which will protect adjacent and intersected resources.

Desired Conditions

** **Recreation:** Dispersed recreation activities such as fishing, berry picking, Christmas tree cutting, etc. may occur with the management of this area. Opportunities for dispersed recreation will be enhanced where appropriate. Recreation activities of a highly developed nature in adjacent areas may be compatible with the management of these areas. Recreation facilities are generally outside and adjacent to this corridor. A full range of recreation opportunities, except primitive, are available.
** **Visual:** Disturbance from a natural condition will generally be evident from the foreground. Adverse visual impacts, as seen from sensitive viewing corridors in the middle or background, will be minimized. Mitigation will be consistent with adopted VQOs. Within the corridor partial retention and modification will generally apply.
** **Timber:** Timber on these lands may be scheduled for harvesting in conjunction with development of road routes.
** **Soil and Water:** Protection will be provided for the soil and water as required under State and Federal laws. The intent is to maintain soil cover, minimize slope failure and reduce the degree of risk and potential effects from soil erosion and mass wasting.
** **Transportation Management** will provide for an integrated transportation system to accommodate appropriate public need, which is consistent, with resource protection and management objectives for the area. Access projects will be coordinated with other Federal Agencies and the State of Alaska, as appropriate.

** **Subsistence** use will be allowed to occur in a manner consistent with the management objectives of the area and in accordance with Federal and State regulations.

Utility Corridors

Management Emphasis

The primary management emphasis for this prescription is to allow for the establishment of resource and energy transmission corridors and facilities not associated with road access.

Area Description

These areas are managed to accommodate public energy transmission needs. The areas include existing and proposed facility and utility corridors such as dams, reservoirs, generators, powerlines, pipelines and pumpstations and other rights-of-way necessary to accommodate use across National Forest land. Sites and corridors include the land directly under and immediately adjacent to the facilities. Sites have significant improvements located within a generally compact area while corridors are by nature linear and have limited variable width. Sites and corridors will generally be void of large, hazardous vegetation but may contain low lying ground vegetation.

Management Goals

The land management goal attained with this prescription is to have corridors and sites available for resource and energy generation and transmission with minimum vegetative impact and are removed from heavier used areas.

Desired Conditions

** **Recreation:** Dispersed recreation activities such as fishing, berry picking, Christmas tree cutting, etc. will be allowed if compatible with the management objectives of these areas. Opportunities for dispersed recreation will be enhanced where appropriate. Recreation activities of a highly developed nature, are generally not compatible with the management of these areas, and will generally not be provided for. Roaded modified opportunities will generally apply.
** **Visual:** Disturbance from a natural condition will generally be evident from the foreground. Adverse visual impacts, as seen from sensitive viewing corridors in the middle or background, will be minimized. Mitigation will be in accordance with adopted VQOs. Visual condition IV or V generally result from application of this prescription.
** **Timber:** Timber on these lands may be scheduled for harvesting in conjunction with development of site and utility corridors.
** **Wildlife and Fish:** Fish and wildlife habitat improvement projects may occur in this area but will be consistent with the intent of this prescription. Appropriate considerations will be made to prevent or minimize wildlife and fish conflicts with other uses. The utility will not be a barrier for the cross movement of wildlife and fish through this prescription.
** **Soil and Water:** Protection will be provided for the soil and water as required under State and Federal laws. This prescription will maintain soil cover, minimize slope failure and reduce the degree of risk and potential effects from soil erosion and mass wasting.
** **Transportation Management** will provide for an integrated transportation system to accommodate appropriate public need in a reasonable manner, consistent with resource protection and management objectives for the area.

Projects will be coordinated with other Federal Agencies, such as the Federal Energy Regulatory Commission (FERC) or the Federal Highway Authority (FHA), and the State of Alaska, as appropriate.

** **Subsistence** use will be allowed to occur in a manner consistent with the management objectives of the area and in accordance with Federal and State regulations.

Description of the Prescription Area

Management emphasis provides for maintaining an attractive marine recreation setting which may include facilities to enhance marine recreation opportunities. These locations are capable of providing a variety of recreation opportunities and future use may include their designation as marine recreation system units in coordination with State Marine parks. These areas include the shoreline, beach fringe, and the upland area as well as the existing anchorages and anchor buoys and have existing public use or recreation attributes that attract and support a variety of recreation uses. Activity areas, access points and support facilities are managed to maintain or enhance their long-term utility and attractiveness. Protection and enhancement of recreation settings will take precedence when potential conflict occurs.

Motorized access, primarily by boat and airplane, is common but other motorized use of the upland areas does not occur.

Desired Conditions

** **Cultural** resources, will be protected and may be interpreted.
** **Recreation** use and activities are managed to harmonize with the designated ROS setting and purpose of the site. Sites may be developed to provide the necessary and appropriate facilities to provide for user health, safety, convenience and information needed to facilitate the use, enjoyment and protection of the surrounding area and resources. Primitive, and Semiprimitive Nonmotorized opportunities will be the most common ROS classes in the uplands; Semiprimitive Motorized and Roaded Natural opportunities will be the most common along the shoreline and beach fringe.
** **Visual** conditions will differ, based on the Adopted Visual Quality Objectives for the individual site or area. The predominant visual conditions will be II and III.
** **Timber:** Vegetative management may be scheduled for this area. The objectives of vegetative treatment are to provide healthy stands of trees, vegetative diversity, and wildlife habitat. Insect and disease control, and vegetation management may be performed to maintain the utility and attractiveness of existing and proposed sites and adjacent areas. The priority is given to maintaining or enhancing the recreation setting.
** **Transportation:** A variety of transportation systems such as developed trails are appropriate to enhance recreation use. Log transfer facilities are not generally located here.
** **Facilities:** A variety of recreation facilities are appropriate including recreation cabins, shelters, anchor buoys, boat and/or float plane docks, boat ramps, tent platforms or pads, and other structures such as communication facilities and aids to navigation. Facilities will be designed to harmonize and blend with the characteristic landscape. Large scale commercial recreation facilities are usually not located in these areas.

** **Fish**: Emphasis is on maintaining naturally appearing riparian and stream habitat conditions. F&W projectsx will incorporate VQO's for the area.
** **Wildlife**: Emphasis is on maintaining naturally appearing habitat conditions and enhancing viewing opportunities.
** **Fire**: Natural and human caused fires are normally surpressed but may be allowed to burn under controlled conditions to enhance wildlife habitat conditions.
** **Insect and Disease**: Integrated pest management principles are applied during project implementation to improve the health of the vegetative cover.

RESOURCE: Recreation

Activity: Recreation Use Administration **NAS Code:** AN122

I. **General Direction** - General Recreation Management and Operations

A. Manage for Primitive opportunities in the uplands and Semi-primitive motorized and Roaded Natural opportunities along the shoreline and beach fringes.

B. When locating anchor buoys, use the following criteria in addition to those found in the Forest-wide standards and guidelines (III-24) and the R-10 facilities handbook Chapter 500 - Anchor Buoys including Appendix 7, 7A.

1. Locations should be in bays that do not provide good anchorage for small boats.
2. Locations should be in areas where wind or severe weather limit anchorage.
3. Locations should enhance dispersed recreation opportunities.
4. Locations should not be selected where there is already good anchorage.

Activity: Visual Resource Operations **NAS Code:** AV1

I. **General Direction**

A. Visual character of the area may be in an altered appearance, design activities to not be evident to the casual observer utilizing natural form, line and texture found in the environment.

Standards and Guidelines

1. Apply Management Area-wide standards and guidelines for the Retention and Partial Retention Visual Quality Objectives. This objective defines the maximum limit of allowable change to the visual character of the area; less visible evidence of activities is acceptable.

2. Rehabilitate areas to a desirable visual character where conditions warrant.

RESOURCE: Transportation

Activity: Transportation Improvement Planning NAS Code: LT 212

I. **General Direction**

A. Designate road corridors where necessary to allow access for planned management activities in this or other management areas.

Standards and Guidelines

Research Natural Areas (RNA) are part of a national network of ecological areas designed for research and education, or to maintain unique examples of diversity on National Forest System lands. Research Natural Areas may be used for non-manipulative research, observation, and study. A RNA may carry out provisions of special acts, such as the Endangered Species Act or the monitoring provision of the National Forest Management Act. Proposed research natural areas requiree a written report with recommendations be submitted for approval by the Chief of the Forest Service. Individual management plans will be written for each Research Natural Area.

In addition to the Forest-wide Management Direction, the following Desired Resource Condition and Standards and Guidelines will apply to this area.

Desired Condition

**Recreation: Recreational management allows only forms and levels of recreation use which do not threaten or interfere with the objectives or purposes for which the research natural area was established.

**Visual:Visual quality objective of the area is preservation.

**Fish: Fish habitat improvement projects must be compatible with the objectives for which the RNA was established.

**Wildlife: Wildlife habitat improvement projects must be compatible with the objectives for which the RNA was established.

**Timber: Proposed and designated RNA's will not be scheduled for timber harvest.

**Minerals: RNA's will be recommended for withdrawal from mineral entry in conformance with section 204 of the Federal Land Policy and Management Act of 1976.

**Transportation: Roads will not be permitted unless they contribute to the objectives or to the protection of the RNA.

**Fire: Fire will be extinguished as quickly as possible utilizing techniques that maintain the character of the RNA.

**Insect and Disease: Generally, no action taken against endemic insects, diseases, wildplants, or animals unless deemed necessary to protect the features for which the RNA was established.

**Subsistence: These activities will be allowed which do not threaten or interfere with the objectives or purposes for which the research natural area was established.

RESOURCE: Recreation

Activity: Recreation Use Administration NAS Code: AN122

I. General Direction

A. Provide only those specific types and intensities of recreation activities and opportunities that can be accommodated without endangering or altering the natural biological processes occurring within the area.

B. Issue appropriate small orders regulating public use within the area necessary to assure non-degradation of the natural environments for which the area has been established.

RESOURCE: Visuals

Activity: Visual Resource Operations NAS Code: AV1

I. General Direction

A. Allow the visual character of the area to naturally evolve, with only ecological changes occuring.
Standards and Guidelines
1. Apply Forest-wide Standards and Guidelines for the Preservation Visual Quality Objective.

RESOURCE: Fish

Activity: Fish Habitat Planning NAS Code: CF112

I. General Direction

A. Plan the construction and maintenance of fish enhancement projects only if they are compatible with the objectives for which the research natural area was established.

RESOURCE: Subsistence

Activity: Subsistence NAS Code: _____

I. General Direction

A. Customary and traditional subsistence uses will be allowed to continue to the extent they are compatible with the individual RNA objectives. Wood cutting is not allowed. Any additional restrictions will be identified in the individual RNA establishment reports and management reports.

Activity: Wildlife Habitat Improvement NAS Code: CW22

I. General Direction

A. Wildlife habitat improvements are not allowed within RNA's.

Activity: Wildlife Habitat Maintenance NAS Code: CW23

I. General Direction

A. Wildlife habitat maintenance is not allowed within RNA's.

RESOURCE: Timber

Activity: Timber Resource Planning NAS Code: ET112

I. General Direction

A. Forested lands are classified as unsuitable and withdrawn from the timber base.

RESOURCE: Soil and Water

Activity: Watershed Resource Planning NAS Code: FW112

I. General Direction

A. Plan the management of soil and water resources only if management is needed to meet the objectives for which the Research Natural Area was established.

Activity: Watershed Resource Improvement NAS Code: FW1

I. General Direction

A. Soil and water improvement measures may occur if they are compatible with the objectives for which the Research Natural Area was established.

RESOURCE: Lands

Activity: Special Use Administration (Non-Recreation) NAS Code: JL122

I. General Direction

A. Allow only those activities which will preserve the Research Natural Area in an unmodified condition or, unless otherwise provided by law, those activities which serve research purposes. (Consult FSM 2700 and 4060)

Standards and Guidelines

1. Coordinate all special use proposals with the responsible Station Director, to ensure compatibility with research objectives.
2. Do not authorize activities which modify ecological processes.

3. Do not permit roads, fences, or signs on a Research Natural Area, unless they contribute to the management objectives or the protection of the area.
4. Do not authorize new buildings or buildings which currently exist but are unauthorized.
5. Only the Station Director, after consultation with the Forest Supervisor, can approve plans for temporary gauging stations and instrument shelters.
6. Encourage the use of Research Natural Areas by responsible scientists and educators.
7. Do not allow road or trail development or special uses of a permanent nature, except for research purposes, unless otherwise provided by law.

Activity: Land Ownership Administration NAS Code: JL123

I. General Direction

A. Request withdrawal from mineral entry, after establishment of a Research Natural area.

Activity: Landline Location and Maintenance NAS Code: JL231, JL24

I. General Direction

A. Ensure that boundaries are clearly identifiable on-the-ground. Clearly identify and monument, corners and boundary turning points, upon establishment of a Research Natural Area. (Consult FSM 4060).

Activity: Land Ownership Adjustments NAS Code: JL26

I. General Direction

A. Retain National Forest lands and acquire private inholdings, through exchange or purchase from willing sellers, as opportunities arise.

RESOURCE: Facilities

Activity: Facilities Improvements NAS Code: LF2

I. General Direction

A. No permanent facilities are permitted.

RESOURCE: Transportation

Activity: Transportation Operations NAS Code: LT1

I. General Direction

A. Roads will not be permitted except for research purposes or otherwise provided by law.

RESOURCE: Law Enforcement

Activity: Law Enforcement Activities NAS Code: FL

I. General Direction

A. Where a special closure is necessary to protect a Research Natural Area from harm, recommend a closure order be issued under provisions of 36 CFR 261.50. Ensure that such orders incorporate the special closure provisions of 36 CFR 261.53.

RESOURCE: Insect and Disease

Activity: FPM Suppression-Federal Lands NAS Code: QC124-1

I. General Direction

A. Suppression of forest pests.
Standards and Guidelines
1. No action will be taken to control insects or diseases unless the outbreak threatens adjacent resources or would drastically alter the natural ecological processes within the RNA.

Appendix H

Site Specific Mitigation

APPENDIX H

SITE SPECIFIC RESOURCE CONCERNS, MITIGATION MEASURES, AND MITIGATION EFFECTIVENESS BY ALTERNATIVE FOR TIMBER MANAGEMENT ACTIVITIES

The figures in this appendix reference Map 27 and list site-specific resource concerns, mitigation measures to be applied, and an estimate of the effectiveness of that mitigation for each timber harvest unit or precommercial thinning location for each alternative in the project area. The probability of implementing all mitigation measures portrayed in these figures is moderate, which denotes a greater than 75 percent certainty that the mitigation will be implemented as planned.

The following interpretation key is provided as an aid for user interpretation of the mitigation figures. Items appearing in darker print correspond to the column headings in the figures.

UNIT NO: Harvest unit identification number for alternative (see Map 27).
STAND NO: Stand identification letter for precommercial thinning areas (see Map 27.

RX: Management Prescription number of harvest unit or stand to be thinned (Reference Appendix G for narrative descriptions of each prescription).

Code	Description
15	= Riparian Prescription
17	= Wildlife-Visual/Timber Prescription
18	= Timber/Wildlife-Visual Prescription
19	= Timber Production Prescription

ACRES: the acreage of the harvest unit or stand to be thinned.

LS: Logging System that will be used to harvest the unit.

Code	Description
TR	= Tractor system such as rubber tired skidder or shovel yarder
HL	= Highlead cable system

YD: Direction logs will be yarded in the unit relative to the slope.

Code	Description
LE	= logs will be yarded on level ground to landing
UH	= logs will be yarded uphill to landing
DH	= logs will be yarded downhill to landing

Concern: potential site-specific concern for a resource value present in or adjacent to the unit to be harvested or the stand to be thinned. Concern codes and descriptions are listed under the applicable resource heading.

Mitigation: the site-specific mitigation measure(s) that are to be applied in the harvest unit or stand to be thinned to mitigate the resource concern. Mitigation codes and descriptions are listed under the applicable resource heading.

Effectiveness: A relative estimate of the specified mitigation effectiveness in mitigating the specified resource concern. The following ratings apply to all estimates of mitigation effectiveness:

Code	Description
HIGH	Estimated to be almost 100% effective in mitigating concerns.
MODERATE	Estimated to be greater than 75% effective in mitigating concerns.
LOW	Estimated to be less than 75% effective in mitigating concerns.
N/A	Not applicable because no mitigation was specified.

CULTURAL

CONCERNS

Code	Description
EHS	Existing Historic site within the harvest unit. Acheological survey will be done prior to or during layout to locate, mark, and document any existing sites. Sites will be avoided where possible during sale operations.
UNSURVEYD	Cultural resources are unsurveyed.
NONE	No concerns.

MITIGATION MEASURES

Code	Description
CULTURAL S/G	Apply Cultural Resouce Standards & Guidelines to mitigate any cultural resource concerns in the harvest unit or stand.
NONE REQUIRED	No mitigation is required.

LANDS

CONCERNS

Code	Description
PVT BOUNDARY	Forest Service Land is adjacent to Private Land.
NONE	No concerns.

MITIGATION MEASURES

Code	Description
SURVEY LL	Survey and identify land line location prior to unit layout.
NONE REQUIRED	No mitigation is required.

SOIL AND WATER

CONCERNS

Code	Description
WT	Possible windthrow problem to be considered. Locate unit boundary to minimize windthrow risk.
TOG	Thin Surface Organic Layer
SE	Mineral soil is susceptible to rill and sheet erosion
MM	The high rainfall and the steep slope gradients make these soils more susceptible to mass movements.
VN	This slope has numerous V-Notches which need to be protected to prevent accelerated erosion and mass movements.
Str.B	Logging across streambanks could cause significant erosion and stream sedimentation.
FP	The thin organic surface layer which is necessary for reforestation is very suceptible to removal by tractor skidding techniques.
SS	The steep gradient of the sideslopes make the mineral soil susceptible to rill and sheet erosion upon removal of the surface organic layer.
NONE	No concerns.

MITIGATION MEASURES

Code	Description
PS	Partial suspension will be required during yarding to protect the surface organic layer. Specific area will be determined during unit layout by a soil scientist and will be designated in the timber sale contract.
FS	Full suspension will be required during yarding. Specific area will be determined during unit layout by a soil scientist and will be designated in the timber sale contract.
YR	Tractor yarding is restricted to periods of the year when snow cover is present
AR	Artificial Regeneration may be necessary to establish a fully stocked stand of trees on these soils.
SSP	The side slopes must be protected to prevent soil erosion and sedimentation of the creeks that flow near to or through the cutting unit.
PFP	The surface organic layer must be protected to insure acceptable reforestation.
PVN	Logging methods should include falling trees away from and out of V-notches. All slash should be cleaned out of V-notches immediately after logging.
DF	Trees should be fell in a direction away from streams, steep sideslopes susceptible to erosion, and V-notches.
SC	All logging debris and slash must be cleaned out of streams immediately after logging.
PStr.B	Use mitigation measures such as Full Suspension, directional falling away from water courses, and avoiding use of skidders on stream banks to protect the stream bank and water quality.
NONE REQUIRED	No mitigation is required.

VISUAL RESOURCES

CONCERNS (MEETING THE ADOPTED VISUAL QUALITY OBJECTIVE(S). In cases where the ADJUST, ADJ/S&S, or OK/S&S mitigation measures is applied, the concern is to maintain a predominantly natural landscape along the arterial road corridor, even where that landscape is not required by the adopted visual quality objectives.)

Code	Description
R	Retention
PR	Partial Retention
M	Modification
MM	Maximum Modification

MITIGATION MEASURES

Code	Description
OK	Unit meets visual quality objective (VQO) set for the area.
Modify	Unit as is does not meet adopted VQO for area and if possible, some modifications will be made during layout to meet the VQO. The degree to which final unit layout does not meet the VQO is acceptable for this entry as per IDT agreement to meet the goals of the alternative.
100'S&S	100 foot slash disposal and stump reduction zone in unit.
150'S&S	150 foot slash disposal and stump reduction zone in unit.
Adjust	Unit as planned meets adopted VQO but the landscape architect would like to make some minor changes to reduce visual impact. These changes generally involve making irregular boundaries in visible portions of the unit. Layout forester and landscape architect will consider changes during field layout.
Adj/S&S	Adjust unit as delineated under the Adjust measure explained above. Also apply the 100'S&S measure for the same purpose of maintaining a predominantly natural appearance along the road corridor.
OK/S&S	Unit meets adopted VQO but the 100'S&S measure is applied to reduce landscape disturbances along the road.
100'NTZ	100 foot no precommercial thinning zone (extends from road or beach into unit 100 feet).
N/A	Not applicable; no mitigation is required.

WILDLIFE:

CONCERNS

Code	Description
NONE	No concerns.
EAGLE:	Existing eagle nests and availability of suitable trees for roosting and future nesting.
GEESE:	Disturbance of geese during critical periods.
DEER:	Short and long term forage and cover values of second growth stands for wintering deer.
SNAGS:	Habitat for snag/cavity nesting wildlife species.

MITIGATION MEASURES

Code	Description
PROTECT:	The 330' windfirm buffer will be established around the known eagle nest. Trees suitable for use by nesting and roosting eagles will be maintained in remainder of unit. Selection criteria for leave trees includes; trees that dominate or codominate a shoreline, trees with large enough branches to support eagles, trees with open crowns, narrow fringe of trees along shoreline.
RETAIN:	Nesting and roosting trees suitable for use by eagles will be retained. Selection criteria for leave trees includes; trees that dominate or codominate a shoreline, trees with large enough branches to support eagles, trees with open crowns, narrow fringe of trees along shoreline.
RO:	Restrict operations in portions of the unit within 330 feet of goose habitat when geese are present during nesting, broodrearing, molting or wintering periods.
LS:	At least 3 hard snags per acre will be maintained in stands within 150 feet of water or openings and 2 hard snags per acre in other areas to provide habitat for snag/cavity nesting wildlife species. Consideration will also be given for leaving green trees for future snag recruitment, non-merchantable trees that show signs of heart-rot, and both soft and hard snags in areas protected by the wind and other factors as described in the Management Area Wide Standards and Guidelines (Appendix F).

WILDTHIN: Precommercial thinning will emphasize wildlife habitat needs. Thinning will be accomplished to include an average tree spacing of 16-20 feet, small unthinned clumps (one-half acre or less) of healthy trees will be maintained, corridors of approximately 50 feet in width will be designated and slash will be lopped and scattered to lie within 2 feet of the ground, openings of one-half acre will be designated in approximately 10% of the stand and slash will be lopped and scattered to lie within 2 feet of the ground. Alder immediately adjacent to streams will be managed to provide 75% shade on the stream and the complete canopy will be removed only along stream sections with abundant cover.

FISHERIES:

CONCERNS

Code	Description
NONE	No concerns.

CLASS I STREAM: Spawning and rearing habitat for anadromous and resident fish in streams within or near unit. May include habitat upstream from migration barriers if there is a reasonable opportunity to provide fish passage in the future.

CLASS II STREAM: Spawning and rearing habitat for resident fish in streams within or near unit. These streams generally occur upstream of anadromous migration barriers or are steep gradient streams which preclude anadromous fish use and have limited sport fisheries values.

CLASS III STREAM: Water quality in streams within or near unit. These streams generally do not contain populations of anadromous fish or significant populations of resident fish, but may have potential water quality influences on downstream fish habitat.

MITIGATION MEASURES

Code	Description
CT1:	Streams will be further inventoried, channel types will be refined and Aquatic Habitat Management Units delineated according to the Management Area Wide Standards and Guidelines prior to field layout of harvest unit (See Appendix F). Stream channel types are defined in the Channel Types Field Guide (R-10-M-6). Includes units with Class I and II streams.

CT2 Streams will be further inventoried, channel types will be refined and Aquatic Habitat Management Units delineated according to the Management Area Wide Standards and Guidelines during field layout of harvest unit (See Appendix F). Stream channel types are defined in the Channel Types Field Guide (R-10-M-6). Includes units with no identified streams or only Class III streams.

H Unit has a moderate/high potential for adverse impacts on fish habitat. Unit will require field review to determine if additional protection measures may be required.

CLASS I: See mitigation measures common to all AHMU classes and measures specific to Class I AHMUs below.

1. Directionally fall timber away from streamcourses (to include lining and jacking as necessary).
2. Fully suspend any trees or products yarded across streamcourses.
3. Leave any trees that cannot be directionally felled away from the streamcourse.
4. Leave all windthrow in or suspended over the stream channel unless doing so would adversely effect stream channel stability. Allow salvage only if AHMU objectives are met.
5. Leave all trees inadvertently felled into or across streams in place unless doing so would adversely effect stream channel stability or water quality.
6. Leave as many of the following trees as possible within 75 ft. of the stream:
   * deciduous trees
   * coniferous trees less that 12 in. DBH
   * snags
   * trees with a 10% or greater lean toward the stream
7. Designate additional leave trees as necessary to provide for future sources of large woody debris (LWD).
8. Remove all small, unattached debris introduced into the streamcourse by human activity within 48 hours of its introduction.
9. During precommercial thinning activities:
   * manage alder immediately adjacent to the stream to provide 75 percent shade on the stream.
   * remove the complete canopy only along stream sections with abundant instream cover.
10. The following criteria will provide additional direction for timber harvest activities within Aquatic Habitat Management Units depending on the channel type of the stream. Distances shown are windfirm distances from the streambank; greater distance may be required to achieve reasonable assurance that windthrow will not occur within the windfirm distance as a result of adjacent harvest activity.
    A. Low Gradient Floodplains (Channel types B1, B8, C1, C3, C4, D4, D5)

* No harvest within 0 to 60 feet of streambanks for B1 or B8 channel types not associated with other channel types.
* Allow single tree selection harvest only within 60 to 200 feet on the above channels.
* No harvest within 0 to 200 feet of streambanks on C1, C3, C4, D4, and D5 channels.

B. Estuary Channels (Channel types E1, E2, E3, E5)
* No harvest within 500 feet of E1 and E5 channels.
* No harvest within 200 feet of E2 and E3 channels.

C. Alluvial Fans (Channel Types A3, B5, D1, D6).
* No harvest within active portion of fan or 60 feet of streambank, whichever is greater.

D. Low Gradient Nonforested Channels and Moderate Gradient Footslope Channels.
* Allow single tree selection only within AHMU.

E. Lakes and Ponds (Channel types L, L3, L4, L5).
* Allow unevenage management within 200 feet.

F. Moderate Gradient Incised Channels (Channel types B4, B6).
* Selectively leave trees with crowns that do not extend above slope break.
* Maintain near natural snag component of stand.
* No harvest within 25 feet of streambank.

G. Large Low Gradient Incised Channels (Channel types C2, C5).
* No harvest within the inner gorge.

H. Placid or Glide Channels (Channel types L1, L2).
* No harvest except for incidental tree selection (e.g. bridge stringers).

CLASS II: See mitigation measures common to all AHMU classes and measures specific to Class II AHMUs below.

1. Directionally fall timber away from streamcourses, to the extent practicable. Trees which cannot be felled away from the stream will be felled to bridge the stream.
2. Partially suspend any trees or products yarded across streamcourses.
3. Yard timber influencing a streamcourse the same season as felled.
4. Remove all small, unattached debris introduced into the streamcourse by human activity within 48 hours of its introduction.
5. Leave all windthrow in or suspended over the stream channel unless doing so would adversely effect stream channel stability. Allow salvage only if AHMU objectives are met.
6. Leave as many of the following trees as possible within 75 ft. of the stream:
   * deciduous trees
   * coniferous trees less that 12 in. DBH
   * snags
   * trees with a 10% or greater lean toward the stream

7. The following criteria will provide additional direction for timber harvest activities within Aquatic Habitat Management Units depending on the channel type of the stream. Distances shown are windfirm distances from the streambank; greater distance may be required to achieve reasonable assurance that windthrow will not occur within the windfirm distance as a result of adjacent harvest activity.
   A. Alluvial Fans (Channel Types A3, B5, D1, D6).
      * No harvest within active portion of fan or within 25 feet of streambank, whichever is greater.
      * Allow single tree selection only within 25 to 60 feet from streambank if not within active protion of fan.
   B. Low Gradient Nonforested Channels and Moderate Gradient Footslope Channels (Channel types B2, B3).
      * Allow single tree selection only within 25 windfirm feet of B2 channels.
      * Allow single tree selection only within 60 windfirm feet of B3 channels.
   C. Lakes and Ponds (Channel types L, L3, L4, L5).
      * Allow unevenage management within 100 feet of lakes less than 50 acres in size.
      * Allow unevenaged management within 200 feet of lakes greater than 50 acres in size.
   D. Moderate Gradient Incised Channels (Channel types B4, B6).
      * Allow harvest to the streambank.
   E. Large Low Gradient Incised Channels (Channel types C2, C5).
      * No harvest within 25 feet of streambank.
      * Full suspension required to cross stream channel.
   F. Placid or Glide Channels (Channel types L1, L2).
      * No harvest within AHMU except for incidental tree selection (e.g. bridge stringers).

CLASS III: See mitigation measures common to all AHMU classes and measures specific to Class III AHMUs below.

1. Directionally fall timber away from streamcourses, to the extent practicable.
2. Partially suspend any trees or products yarded across streamcourses.
3. Avoid yarding up or down streamcourse.
4. No ground lead yarding downhill within V-notches.
5. Yard timber influencing a streamcourse the same season as felled.
6. Remove all rootwads and all large accumulations of limbs, tops, and other introduced debris which may have the potential to impede or divert the natural streamflow concurrent with yarding.
7. The following criteria will provide additional direction for timber harvest activities within Aquatic Habitat Management Units depending on the channel type of the stream. Distances shown are windfirm distances from the streambank; greater

distance may be required to achieve reasonable assurance that windthrow will not occur within the windfirm distance as a result of adjacent harvest activity.

A. High Gradient and Moderate Gradient Incised Channels (Channel types A1, A2, A4, A5, A6, A7, B4, B6, B7, D2, D7)
   * Allow harvest to the streambank.
   * Full suspension required to cross stream channel.

B. Alluvial Fans (Channel Types A3, B5, D1, D6).
   * No harvest within active portion of fan or within 25 feet of streambank, whichever is greater.

C. Low Gradient Nonforested Channels and Moderate Gradient Footslope Channels (Channel types B2, B3).
   * Allow only single tree selection within 25 windfirm feet of B2 channels.

CLASS I, CLASS II and CLASS III:

1. Use streams as split lines whenever possible (i.e. logs should be yarded away from the stream in both directions rather than across the channel.)
2. Felled or windfallen trees designated for removal from streamcourses will not be limbed until clear of the streamcourse.
3. Leave standing all trees which affect streambank stability, including all deciduous and unmerchantable vegetation.
4. Leave all existing (natural) instream debris.
5. Revegetate areas of exposed mineral soil during the first growing season following exposure.
6. Additional mitigation measures for associated road construction activities, timing and use of heavy equipment in streams, bridge and culvert installation and fish passage requirements are included in the fish and access sections of the Management Area Wide Standards and Guidelines (Appendix F).

Figure II-1: ALTERNATIVE 2 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	PVT BOUNDARY	TOG <10% OG re-	StrB & FP	CLASS I STREAM	EAGLE, SNAGS	M
1	17	13	TR	LE	Mitigation	CULTRL S/G	SURVEY LL	moval YR	PStrB & FP,SC	CT1,CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	HIGH	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-d	StrB & FP	CLASS I STREAM	EAGLE, SNAGS	M
2	17	13	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStrB & FP,SC	CT1,CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
3	19	32	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2,CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE,VN	SE	CLASS III STREAM	SNAGS	PR
4	18	24	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2,CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, SNAG	R,PR
5	18	38	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2,CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	EAGLE, SNAG	R,PR
7	18	12	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1,CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
8	19	29	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	Fs over VN, PS	SSP	CT2,CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR,M
9	19	20	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2,CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR,M
11	19	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2,CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MPD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE		CLASS III STREAM	SNAGS	PR,M
12	19	38	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2,CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM	EAGLE, SNAG	R
13	18	7	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1,CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & WT, cliff	SE	CLASS I STREAM	EAGLE, SNAGS	R
14	18	11	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT1,CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW, LOW	N/A

Figure H-1: ALTERNATIVE 2 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	WT	SE	CLASS III STREAM	SNAGS	PR
15	19	16	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & WT, cliff	SE	CLASS I STREAM	EAGLE,GEESE,SNAGS	R
16	18	19	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT1, CLASS I	PROTECT, RO, LS	MODIFY,100'S&S
					Effectiveness	HIGH	N/A	MODH	HIGH	HIGH	MOD., MOD, LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & WT, cliff	SE	CLASS III STREAM	EAGLE, SNAGS	R
17	18	15	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	PROTECT, LS	MODIFY
					Effectiveness	HIGH	N/A	MODH	HIGH	HIGH	MODERATE, LOW	MODERATE
18					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
&	18	16	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSS	CT2, CLASS III	LS	OK
19					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
20	18	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str.B	CLASS III STREAM	SNAGS	PR
21	18	31	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over Str, SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & WT,cliff	SE	CLASS III STREAM	EAGLE, SNAGS	PR,M
22	19	14	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & WT, cliff	SE	CLASS III STREAM	EAGLE, SNAGS	PR
23	18	15	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	GEESE, SNAGS	M
24	19	14	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG OF FP	SE & Str.B	CLASS III STREAM	SNAGS	M
25	19	11	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	YR	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str.B	CLASS III STREAM	SNAGS	M
26	19	6	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PFP	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE & VN	Str.B	CLASS III STREAM	SNAGS	M
27	19	30	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PVN,PS	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A

Figure H-1: ALTERNATIVE 2 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
41	18	21	HL	VH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
43	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM upper slope	SE	CLASS III STREAM	SNAGS	PR,M
44	18	21	HL	VH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
45	18	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & PVN	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	Active MM	SE	CLASS I STREAM	SNAGS	PR
46	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	Avoid MM,FS	SSP, FS over VN	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	LOW	LOW	HIGH	LOW	LOW
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR,M
47	18	12	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str.B	CLASS III STREAM	SNAGS	PR
48	18	22	HL	VH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr.B	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS I STREAM, H	SNAGS	R
49	18	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
50					Concern	UNSURVEYED	NONE	MM & SE	SE & Str.B	CLASS III STREAM	SNAGS	R,PR
51	18	58	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN	,FS over Str,SC	CT2, CLASS III	LS	MODIFY
52					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE

Figure H-2: ALTERNATIVE 3 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	PVT BOUNDARY	TOG <10% OG re-	Str.B & SE	CLASS I STREAM	EAGLE, SNAGS	M
1	17	13	TR	LE	Mitigation	CULTRL S/G	SURVEY LL	moval YR	P Str.B & FS,SC	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	HIGH	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.B & SE	CLASS I STREAM	EAGLE, SNAGS	M
2	17	13	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	P Str.B & FS,SC	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
3	19	32	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE, VN	MM & SE, VN	CLASS III STREAM	SNAGS	PR
4	18	24	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over VN,PS	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE,VN	SE	CLASS III STREAM	EAGLE, SNAGS	R,PR
5	18	38	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over SE,VN	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW , LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	EAGLE, SNAGS	R,PR
7	18	12	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP & PStr.	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE,VN	SE	CLASS III STREAM	SNAGS	PR
8	19	29	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over SE, VN	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR,M
9	19	20	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM,SE	SE	CLASS III STREAM	SNAGS	PR,M
11	19	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM,SE	SE	CLASS III STREAM	SNAGS	PR,M
12	19	38	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & WT,cliff	SE	CLASS I STREAM	EAGLE,GEESE,SNAGS	R
16	18	19	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT1, CLASS I	RETAIN, RO, LS	MODIFY,100'S&S
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW,MODERATE,LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & WT,cliff	SE	CLASS III STREAM	EAGLE, SNAGS	R
17	18	15	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	PROTECT, LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW, LOW	MODERATE

Figure H-2: ALTERNATIVE 3 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
18					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
&	18	16	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
19					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
20	18	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str.B	CLASS III STREAM	SNAGS	PR
21	18	31	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over Str,SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & WT, cliff	SE	CLASS III STREAM	EABLE, SNAGS	PR,M
22	19	14	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & WT,cliff	SE	CLASS III STREAM	EAGLE, SNAGS	PR
23	18	15	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS & AR	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	GEESE, SNAGS	M
24	19	14	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG on FP	SE & Str.B	CLASS III STREAM	SNAGS	M
25	19	11	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	<10% OG removal	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG on FP	SE & Str.B	CLASS III STREAM	SNAGS	M
26	19	6	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	<10% OG removal	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str.B	CLASS III STREAM	SNAGS	M
27	19	30	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS,PVN	FS over Str.SC	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM,SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
28	18	20	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW, LOW	N/A
29					Concern	UNSURVEYED	NONE	MM, SE	SE	CLASS III STREAM	SNAGS	PR
&	18	25	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
30					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
31					Concern	UNSURVEYED	NONE	SE	SE, Str.B	CLASS III STREAM H	EAGLE, SNAGS	R,PR
&	18	36	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PVN,PS	P Str.B	CT2, CLASS III	RETAIN, LS	MODIFY
32					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE

Figure H-2: ALTERNATIVE 3 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM, SE	SE	CLASS III STREAM	SNAGS	PR
34	18	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over Str,SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	LOW
					Concern	UNSURVEYED	NONE	MM, SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
37	18	25	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.	CLASS I STREAM, H	EAGLE,GEESE, SNAG	M
38	15	60	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS, PStr,SC	CT1, CLASS I	RETAIN, RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW,MODERATE,LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	SNAGS	M
39	15	21	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS. PStr,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM	SNAGS	PR,M
40	19	41	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.	CLASS I STREAM, H	SNAGS	M
41	15	18	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS. PStr,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	Str	CLASS III STREAM	SNAGS	PR
42	18	21	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr.B	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
43	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
45	18	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over VN	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM,SE	SE	CLASS I STREAM	SNAGS	PR
46	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	avoid VN,FS	SSP	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	LOW
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR,M
47	18	12	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	STR.B	CLASS III STREAM	SNAGS	PR
48	18	22	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS OVER Str,SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE

Figure II-2: ALTERNATIVE 3 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS I STREAM, H	SNAGS	R
49	18	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
50					Concern	UNSURVEYED	NONE	MM & SE	SE & STR.B	CLASS III STREAM	SNAGS	R,PR
51	18	58	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over Str,SC	CT2, CLASS III	LS	MODIFY
52					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE

Figure H-3: ALTERNATIVE 4 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.B & SE	CLASS I STREAM	EAGLE, SNAGS	M
1	17	13	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & FP	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.B & SE	CLASS I STREAM	EAGLE, SNAGS	M
2	17	13	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr. & FS,SC	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	EAGLE, SNAGS	R,PR
7	18	12	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP & PStr.	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
8	19	29	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, SP	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR,M
11	19	38	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE-	CLASS III STREAM	SNAGS	PR
20	18	31	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
21	18	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
31					Concern	UNSURVEYED	NONE	SE	SE & Str.B	CLASS III STREAM H	EAGLE, SNAGS	PR
32	18	65	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over Str,SC	CT2, CLASS III	RETAIN, LS	MODIFY
33					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	LOW
					Concern	UNSURVEYED	NONE	MM,VN slopes>15%	SE & Str.B	CLASS III STREAM	SNAGS	PR
35	18	19	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN	FS over VN	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
36					Concern	UNSURVEYED	NONE	MM,SE	SE	CLASS III STREAM	SNAGS	PR
&	18	45	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	MODIFY
37					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM, SE	SE	CLASS III STREAM	SNAGS	PR
43	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
45	18	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A

Figure H-3: ALTERNATIVE 4 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR,M
47	18	12	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
48					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM	SNAGS	R,PR
&	18	43	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	MODIFY
49					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
50					Concern	UNSURVEYED	NONE	MM & SE	SE & Str	CLASS III STREAM	SNAGS	R,PR
51	18	58	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over Str,SC	CT2, CLASS III	LS	MODIFY
52					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS I STREAM, H	EAGLE, SNAGS	PR,M
53	17	85	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	PFP & SSP	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	EAGLE, GEESE, SNAG	M
54	19	20	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS OVER VN,PS	SSP	CT2, CLASS III	RETAIN, RO, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW,MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE & Str.B	CLASS I STREAM	EAGLE, SNAGS	M
55	19	61	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.B	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG,MM>slopes45%	SE & Str. B	CLASS I STREAM	SNAGS	M
57	19	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PMM, <10% OG removal, PStr.B FS		CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE & Str.B	CLASS I STREAM, H	SNAGS	M
59	19	48	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR 1	PStr.B FS	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE	CLASS I STREAM	SNAGS	M
60	19	67	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	SSP	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10 OG re-	Str.B & SE	CLASS I STREAM	SNAGS	M
63	19	37	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS over Str,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM below unit	SE	CLASS III STREAM	SNAGS	M
65	19	32	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM below unit	STR.B	CLASS I STREAM	SNAGS	M
66	19	11	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr.B by FS,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	N/A

Figure H-3: ALTERNATIVE 4 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str.B	CLASS I STREAM	SNAGS	M
69	19	33	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str. B	CLASS I STREAM, H	SNAGS	M
70	19	30	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	GEESE, SNAGS	M
71	19	52	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	M
74	19	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A

Figure II-4: ALTERNATIVE 5 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	PVT BOUNDARY	TOG <10% OG re-	Str.B & SE	CLASS I STREAM	SNAGS	M
1	17	13	TR	LE	Mitigation	CULTRL S/G	SURVEY LL	moval YR	P.Str.B & FP	CT1, CLASS I	LS	ADJ/S&S
					Effectiveness	HIGH	HIGH	HIGH	HIGH	HIGH	LOW	HIGH
					Concern	UNSURVEYED	NONE	SE	SE	CLASS I STREAM	EAGLE, SNAGS	R,PR
7	18	12	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP & PStr	CT1, CLASS I	RETAIN, LS	ADJ/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
8	19	29	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	ADJUST
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS I STREAM	EAGLE, SNAG	R
13	18	7	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT1, CLASS I	RETAIN, LS	ADJ/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	SNAGS	PR
20	18	31	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, SNAGS	PR
21	18	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
31					Concern	UNSURVEYED	NONE	SE	Str & SE	CLASS III STREAM H	EAGLE, SNAGS	PR
&	18	36	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over Str,SC	CT2, CLASS III	RETAIN, LS	MODIFY
32					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE + Str B	CLASS III STREAM	SNAGS	PR
34	18	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over Str,SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	LOW
36					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
&	18	45	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	MODIFY
37					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	STR.B	CLASS I STREAM, H	EAGLE,GEESE,SNAGS	M
38	15	33	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.B.FS,SC	CT1, CLASS I	RETAIN, RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW,MODERATE,LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str. B	CLASS I STREAM, H	SNAGS	M
39	15	38	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr. B,FS,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR,M
40	19	41	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	N/A

Figure H-4: ALTERNATIVE 5 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
43	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
45	18	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR,M
47	18	12	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	Str.B	CLASS III STREAM	SNAGS	PR
48	18	22	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr. B.	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM, H	SNAGS	R
49	18	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
50					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	R,PR
51	18	58	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	MODIFY
52					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE, Str	CLASS I STREAM, H	EAGLE, SNAGS	PR,M
53	17	85	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP & PStr	CT1, CLASS I	RETAIN, LS	OK/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE
54					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	EAGLE, SNAGS	M
&	19	98	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS over Str.SC	CT1, CLASS I	RETAIN, LS	ADJ/S&S
56					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	LOW
					Concern	UNSURVEYED	NONE	MM slopes >45%	SE	CLASS I STREAM	EAGLE, SNAGS	M
57	19	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP	CT1, CLASS I	RETAIN, LS	ADJ/S&S
					Effectiveness	HIGH	N/A	LOW	MOD	HIGH	LOW, LOW	LOW
					Concern	UNSURVEYED	NONE	MM slopes >45%	SE	CLASS III STREAM	SNAGS	M
58	19	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	LOW	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	SNAGS	M
60	19	37	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	FS over Str,SC	CT1, CLASS I	LS	ADJ/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	LOW
					Concern	UNSURVEYED	NONE	MM slopes >45% &	TOG	CLASS I STREAM	SNAGS	M
63	19	67	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, <10% OG removal ,SC		CT1, CLASS I	LS	ADJ/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE

Figure H-4: ALTERNATIVE 5 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM slopes >45%	SE	CLASS I STREAM	SNAGS	M
65	19	32	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN	SSP & PStr	CT1, CLASS I	LS	ADJ/S&S
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	M
66	19	11	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	ADJ/S&S
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10 OG re-	Str.	CLASS I STREAM	SNAGS	M
69	19	33	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.	CT1, CLASS I	LS	OK/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10 OG re-	Str.	CLASS I STREAM	SNAGS	M
70	19	30	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.	CT1, CLASS I	LS	OK/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10 OG re-	Str.	CLASS I STREAM, H	SNAGS	M
71	19	52	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.	CT1, CLASS I	LS	ADJ/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	SNAGS	M
72	15	25	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	STR	CLASS I STREAM, H	SNAGS	M
73	15	65	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr,SC	CT1, CLASS I	LS	OK/S&S
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	GEESE, SNAGS	M
74	19	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RO, LS	ADJ/S&S
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	MODERATE, LOW	MODERATE

Figure H-5: ALTERNATIVE 6 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	PVT BOUNDARY	TOG <10% OG re-	StrB & SE	CLASS I STREAM	SNAGS	M
1	17	13	TR	LE	Mitigation	CULTRL S/G	SURVEY LL	moval YR	PStr.B & FP,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	HIGH	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE & Str	CLASS I STREAM	EAGLE, SNAGS	R,PR
7	18	12	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP & PStr	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
8	19	29	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS,FS over VN	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS I STREAM	EAGLE, SNAGS	R
13	18	7	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	SNAGS	PR
20	18	31	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	EAGLE, SWANS	PR
21	18	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
31					Concern	UNSURVEYED	NONE	SE	SE & Str	CLASS III STREAM H	EAGLE, SNAGS	PR
&	18	36	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr & StrB	CT2, CLASS III	RETAIN, LS	MODIFY
32					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM	SE & Str	CLASS III STREAM	SNAGS	PR
34	18	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	PStr	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	LOW
36					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
&	18	45	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	FS over Str&VN	CT2, CLASS III	LS	MODIFY
37					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	EAGLE,GEESE,SNAGS	M
38	15	33	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	RETAIN, RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	SNAGS	M
39	15	21	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR,M
40	19	41	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	HIGH	HIGH	LOW	N/A

Figure H-5: ALTERNATIVE 6 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
43	18	48	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR
45	18	27	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	PR,M
47	18	12	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	Str	CLASS III STREAM	SNAGS	PR
48	18	22	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	PStr & Str B,SC	CT2, CLASS III	LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM, H	SNAGS	R
49	18	22	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT1, CLASS I	LS	MODIFY
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
50					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	R,PR
51	18	58	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN, PS	SSP	CT2, CLASS III	LS	MODIFY
52					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	MODERATE
					Concern	UNSURVEYED	NONE	MM & SE	Str B	CLASS I STREAM, H	EAGLE, SNAGS	PR,M
53	17	85	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	FS over VN,PS	FS over StrB,SC	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str & StrB	CLASS I STREAM	EAGLE, SNAGS	M
55	19	61	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr.B, FS,SC	CT1, CLASS I	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	SE	CLASS III STREAM	EAGLE, GEESE,SNAG	M
54	19	20	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP	CT2, CLASS III	RETAIN, RO, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW,MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	SNAGS	M
59	19	44	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	Str	CLASS I STREAM, H	GEESE, SNAGS	M
60	19	37	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS III STREAM	SNAGS	M
61	19	41	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP	CT2, CLASS III	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A

Figure H-5: ALTERNATIVE 6 Site Specific Resource Concerns, Mitigation Measures & Estimated Mitigation Effectiveness by Harvest Unit.

UNIT	RX	ACRES	LS	YD		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
					Concern	UNSURVEYED	NONE	MM	SE & Str	CLASS I STREAM	SNAGS	M
62	19	72	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	PStr & StrB,SSP	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	EAGLE, GEESE,SNAG	PR
67	17	21	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RETAIN, RO, LS	MODIFY
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW,MODERATE, LOW	MODERATE
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	GEESE, SNAGS	M
68	19	28	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RO, LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE & Str	CLASS I STREAM, H	SNAGS	M
71	19	52	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE & Str	CLASS I STREAM, H	SNAGS	M
72	15	25	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	TOG <10% OG re-	SE & Str.	CLASS I STREAM, H	SNAGS	M
73	15	65	TR	LE	Mitigation	CULTRL S/G	NONE REQUIRED	moval YR	PStr & Str.B,SC	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	HIGH	HIGH	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	SE	SE	CLASS III STREAM	GEESE, SNAGS	M
74	19	24	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP	CT2, CLASS III	RO, LS	OK
					Effectiveness	HIGH	N/A	mod	mod	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM	SNAGS	M
75	18	41	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP	CT1, CLASS I	LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW	N/A
					Concern	UNSURVEYED	NONE	MM	SE	CLASS I STREAM	GEESE, SNAGS	M
76	18	26	HL	UH	Mitigation	CULTRL S/G	NONE REQUIRED	PS	SSP & PStr	CT1, CLASS I	RO, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	MODERATE, LOW	N/A
					Concern	UNSURVEYED	NONE	MM & SE	Str	CLASS III STREAM	EAGLE, SNAGS	M
77	18	49	HL	DH	Mitigation	CULTRL S/G	NONE REQUIRED	PS, FS over VN	SSP & PStr	CT2, CLASS III	RETAIN, LS	OK
					Effectiveness	HIGH	N/A	MOD	MOD	HIGH	LOW, LOW	N/A

Figure II-6: ALTERNATIVE 2-6 Site Specific Resource Concerns, Mitigation Measures & Estimate Mitigation Effectiveness by Precommercial Thinning Areas

STANDID	RX	ACRES		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	R/M
A	17	16	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	100'NTZ
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	HIGH
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	R/M
B	17	222	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	100'NTZ
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	HIGH
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR/M
C	17	55	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NWILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
D	19	113	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR/M
E	17	340	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR/M
F	17	56	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
G	19	27	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
H	19	65	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR/M
I	17	169	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR
J	17	14	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
K	19	67	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
L	19	46	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A

Figure H-6: ALTERNATIVE 2-6 Site Specific Resource Concerns, Mitigation Measures & Estimate Mitigation Effectiveness by Precommercial Thinning Areas

STANDID	RX	ACRES		CULTURAL	LANDS	SOILS	WATER	FISHERIES	WILDLIFE	VISUALS
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
M	19	7	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	M
N	17	335	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	NONE	M
O	19	75	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	NONE REQUIRED	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	N/A	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	M
P	17	8	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	NONE	DEER	M
Q	17	12	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	N/A	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	M
R	17	42	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	PR/M
S	17	268	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	M
T	17	15	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	OK
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	N/A
			Concern	NONE	NONE	NONE	NONE	CLASS I STREAM	DEER	R
U	17	24	Mitigation	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED	CLASS I	WILDTHIN	100'NTZ
			Effectiveness	N/A	N/A	N/A	N/A	HIGH	LOW	HIGH

CHUGACH NATIONAL FOREST

BIG ISLANDS MANAGEMENT AREA

Montague Island Portion

TIMBER HARVEST AND PRECOMMERCIAL THINNING UNITS



MAP 27